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Secondarily Infected Tuberculous Fistulae.—Because of the serious complications that may arise from prolonged suppuration, it is important to attack tuberculous sinuses and fistulae vigorously and to effect their closure. Local treatment alone has proved useless in the hands of the author. Various chemotherapeutic agents were tried, and Ciba's sulfanilamidothiazol has proved to be a valuable adjunct in the treatment. The drug is given orally for about ten days. Even on the third and fourth days, improvement is noticed, the amount and the character of the purulent discharge exhibiting a marked change. The final closure of sinuses is still a slow process at best, but the general condition of the patients improves remarkably. Fistula closure is eventually accomplished and the danger of amyloidosis is much reduced.—*Remarque sur le traitement des fistules tuberculeuses surinfectées, M. Wasserfallen, Schweiz. med. Wchnschr., February 15, 1941, 71: 159.*—(*H. M.*)

Tuberculosis of Urachus.—A case is reported, the fourth to be described.—*Tuberculosis of the Urachus with Extensive Intestinal and Peritoneal Tuberculosis, J. H. Winer & J. A. Danciger, Am. J. Dis. Child., March, 1941, 61: 539.*—(*M. B.*)

Anatomical-Roentgenological Study of Pleural Domes.—A study was undertaken to investigate certain normal shadows seen commonly at the apices of the lung on roentgenograms of the healthy chest. Of little significance in themselves, they derive considerable importance from the fact that they may be misinterpreted as representing disease of the lungs or pleura, particularly apical pulmonary tuberculosis. It is believed that accurate evaluations of apical shadows requires not only precise anatomical knowledge of the pleural domes and pulmonary apices, but also familiarity with certain simple concepts of the mechanism of shadow production by which normal structures may cast visible shadows on the roentgenogram. In exposing the pleural dome, the various structures encountered may be considered in the nature of a series of enveloping sheaths, as follows: skin and subcutaneous tissues, an outer muscular layer, an inner muscular layer, a fibrous sheath, a vascular-nervous sheath and the parietal pleura. The anatomy of each structure is fully described,

including also a thorough description of the posterior thoracic wall of the roentgenographic apex. Roentgenographic shadows seen at the lung apices are also analyzed in the light of anatomy. Special reference is made to subpleural apical scars. Evidence is presented to show: (*1*) that such lesions increase in frequency progressively with age, (*2*) that many, if not the majority, of such lesions may well be nontuberculous in origin. The incidence of apical subpleural scars in 109 autopsy cases was found to be 27.6 per cent for persons under forty-five years of age and 68.8 per cent for persons over forty-five years of age. The occurrence of shadows corresponding to apical subpleural scars in 253 chest roentgenograms of nontuberculous individuals was found to be 8.2 per cent for persons under forty-five years of age and 33.6 per cent for persons over forty-five years of age. The possible pathogenesis of such lesions is briefly described.—*An Anatomic-Roentgenographic Study of the Pleural Domes and Pulmonary Apices, H. W. Jamison, Radiology, March, 1941, 36: 302.*—(*G. F. M.*)

Age of Primary Tubercles.—Infiltrative lesions in the lung parenchyma of young people that produce few or no symptoms and are slow to clear are, in the majority of cases, rather recent tuberculous infections. In most instances enlarged lymph nodes may be seen in direct anatomical relation to the infiltrates. The majority of early tuberculous infiltrates clear and form small circumscribed lesions either in the lung parenchyma or lymph nodes, or both, that shrink rapidly during the first year and begin to calcify first at the periphery with a gradual increase in density towards the centre. This process continues for six to seven years beginning about one year after infection. While most of the significant recent primary infiltrates show on the antemortem roentgenograms, only about two-thirds of old primary lesions show on the postmortem roentgenogram and considerably less than one-third show in the lung parenchyma on anteroposterior films. Large, round or uniform circumscribed lesions, with varying amounts of calcification, are occasionally seen and usually represent a stage of resolution of one type of tuberculous infiltrate and may entirely disappear in six months to several years after the infection. Approximately one-third of primary lesions in the parenchyma clear entirely so far as roentgenological appearances are concerned, but most of the time they leave a lymph node complex which is frequently visible on an oblique view. Certain large caseous primary lesions ulcerate promptly leaving cavities that may involve a whole lobe or even a whole lung. Large diffuse infiltrative lesions may resolve, leaving multiple calcified foci of a shrapnel-like appearance. Although the majority of such calcified lesions are healing reinfection tubercles, at times they may be the result of a resolving primary pneumonic infiltrate. There is no way of distinguishing the two without a combined study of serial roentgenograms, a complete history and, perhaps, a tuberculin test. The primary infection of lymph nodes may spread slowly over a period of years from one node to another and gradually calcify. There is no way of distinguishing the late metastases from the earlier ones when they become calcified. Infiltrative lymph node lesions may clear as do lesions in the lung parenchyma. They may enlarge sufficiently to produce pressure atelectasis, a wet lung and pleural effusion. Sometimes infiltrative lesions of the parenchyma and lymph nodes may disappear as a result of excavation and cause a bronchopneumonic tuberculosis. This accident occurs not infrequently in the large lymph node type of tuberculosis in Negro children.—*The Age Criteria of Primary Tubercles Revealed by Roentgenological Study, H. C. Sweany, Am. J. Roentgenol., February, 1941, 45: 187.*—(*W. H. M.*)

Effect of Tubercle Bacilli on Chick Embryo.—The morphological changes in the chorioallantoic membrane of the chick embryo after implantation of three human strains and one bovine strain of live tubercle bacilli were observed. A technique described by Goodpasture and Anderson was used. Tubercles developed from the mesoblastic cells in the mesodermal layer within four to six days. The inoculation of heat-killed tubercle bacilli or of tuberculin did not produce tubercles. The incidence of tubercle formation in the membranes was the greater the more virulent the implanted strains

were. It is suggested that this method is applicable to the determination of the tuberculocidal action of a drug or of its ability to attenuate the virulence of a given strain of tubercle bacilli.—*The Growths and Effects of the Tubercle Bacillus on the Chorio-Allantoic Membrane of the Chick Embryo: A Method for Studies in Chemotherapy, E. W. Emmart & M. I. Smith, Pub. Health Rep., June 20, 1941, 56: 1277.*—(*G. C. L.*)

Lepra Infection of Rabbits.—Since considerable doubt exists as to the causal significance of Duval's chromogenic acid-fast culture from human leprosy, it has occurred to the author that a procedure might be instituted which would result in establishing such a relationship. The present study included (*1*) the experimental production of lesions in the rabbit with Duval's acid-fast culture and certain well known saprophytic forms; (*2*) the determination whether there is a histological similarity of the experimental to the human leprosy lesion with any of the cultures employed; (*3*) the time required to recover in culture from the experimental animal tissues the various bacilli used in the experiments; (*4*) the progressiveness of the induced infection and its duration; and (*5*) a comparative study of the experimental lesions induced with "old" and "recent" isolations of *B. leprae* (chrome Duval). The results show that the chromogenic acid-fast culture recovered from the tissues of human leprosy produces lesions in the rabbit that grossly resemble and microscopically are identical with those seen in the human disease. It is worthy of special mention that lesions of a chronic nature were induced in the rabbit. The tissue alterations were definitely progressive over a period of months. It is significant that the exciting microörganism employed steadily increased in number through the eighth month; as a rule the infection in the rabbit declined after a duration of eight or nine months. The chromogenic acid-fast bacillus employed was recovered from the lesions of the rabbit at the third, fourth and eighth months following the last inoculation. The isolation of the bacillus used in the experiment was more difficult in direct ratio to its residence in the host animal. This feature may in part be due to the chronic insidious character of the disease. It is important here to call attention to the chromogenic acid-fast microbe that was isolated from the lesions of the experimental animal which had been injected with *B. leprae* (chrome Duval). This microörganism had sojourned in the tissues of the rabbit for a period of months. Subsequent injections of this culture into the experimental animal resulted in the production of lesions that were extensive and deep in the substance of the various organs, as evidenced in the animal killed six months after the last inoculation. Adaptation to the new host and exaltation of virulence for Duval's acid-fast microörganism was regularly noted. In the control animals (*B. phlei* and *B. smegmatis*) no gross or microscopical lesions were observed during the entire period of the experiment, except where an animal of group D was killed. This was done to demonstrate the comparative ease of isolation of the control cultures in contrast to the difficulty in recovering *B. leprae* (chrome Duval) from the lesions of the infected rabbit. The cultures inoculated with material from the control animals which were killed three months after the last inoculation remained sterile. It is quite evident from these experiments that cultures of the chromogenic acid-fast bacillus of Duval, which had been recovered from the lesions of human leprosy, induce a chronic form of infection in the rabbit. The chronicity is characterized by tissue changes deep in the parenchyma of various organs. While previous workers report the production of infection in the experimental animal with cultures isolated from human leprous tissues, there has been no mention of the infection having persisted for more than a few weeks. Even in the matter of lesions induced, these persisted only for a short time after the infection had apparently disappeared. In the experiments herein reported infection lasted for a period of months, as was demonstrated by the presence of disseminated active lesions in the rabbit, approximately eight or nine months after inoculation. The experiments herein reported are definite evidence of the pathogenicity of Duval's leprosy culture for the rabbit in which animal there is induced a generalized chronic form of infection. The histopathology of the experimental lesion in the rabbit is identical with that in human

leprosy.—*The Experimental Infection of Rabbits with Duval's Chromogenic Acid-fast Bacillus from Human Leprosy, W. L. Loving, J. Infect. Dis., May-June, 1941, 68: 193.*—(*F. G. P.*)

Inoculation Tuberculosis of Brain.—Intracerebral inoculation of rabbits with tubercle bacilli was performed. The animals were sacrificed on successive days, and histological examination of the brains was done. The first reaction is an exudative inflammation with a predominance of polymorphonuclear leucocytes. This exudate undergoes caseation necrosis. In the later phases polymorphonuclear leucocytes are replaced by lymphocytes, plasma cells and a productive reaction of the surrounding tissue. From the sixth day on, exudative and productive changes coëxist. The experiment was performed with two doses of tubercle bacilli, namely with a small dose of 50,000 bacilli, and a large dose of 10,000,000 bacilli. When the larger quantity is used, the exudative reaction is more pronounced and the productive reaction appears later and is also more intensive. A large number of bacilli are found in the exudative zone and only very few bacilli in the productive zone. Whether the newly formed granulation tissue of the productive zone undergoes caseation necrosis is not definitely decided. It is the author's impression that this is the case. After four or five weeks the process reaches the surface with the production of a meningitis, or the animals succumb to a generalized haematogenous tuberculosis.—*Zur Kenntnis der Impftuberkulose des Gehirns, H. Good, Schweiz. Arch. f. Neurol. u. Psychiat., 1940, 46.*—(*H. M.*)

Respiratory Contagion of Tuberculosis.—Apparatus used for the study of air borne infections has been modified for investigation of tuberculous infection of rabbits. The animals employed were members of inbred families thoroughly studied in previous experiments and found to exhibit rather constant responses to tuberculous infection. The study included families which exhibited (a) marked resistance (b) marked susceptibility and (c) intermediate resistance. The animals were placed for known brief intervals in exposure chambers in which the concentration of nuclei of tubercle bacilli was controlled. The number of nuclei inhaled was calculated. The accuracy of this method was confirmed by bacteriological study of animals sacrificed on the day following exposure. Thus, in an animal calculated to have inhaled 550 droplet nuclei, cultural study of the lung indicated a figure of 660. It was found that animals receiving smaller doses showed a longer pre-allergic period as well as a longer survival period. The type of disease developing in the rabbits when infected with single small doses corresponded to previous findings: susceptible families showed disseminated disease with massive lymph node enlargement, while resistant families showed localized pulmonary lesions of "reinfection" type. These differences were obliterated when massive doses were inhaled. Application of ultra-violet radiation to the exposure chamber resulted in death of 94 per cent of tubercle bacilli.—*Experimental Air-borne Disease, Quantitative Natural Respiration Contagion of Tuberculosis, W. F. Wells & M. B. Lurie, Am. J. Hyg., July, 1941, 34: 21 (Sec. B).*—(*H. L. I.*)

Circulation in Tuberculosis of Lung.—After a review of respiratory and circulatory physiopathology in relation to vasomotor reactions and to functional value of the right ventricle and of the lesser circulation, the author explains the toxic, biochemical and anatomo-pathological changes that pulmonary tuberculosis may cause in the circulatory system and in the respiratory organs. A thorough scrutiny shows that, even though the circulatory organs are not specifically invaded by tuberculous foci, certain important changes occur in the cardiac action and in the circulatory mechanics. These changes vary from simple subjective cardiovascular reactions, such as tachycardia, hypertension and dyspnoea, to more serious disturbances, such as valvular insufficiency, hyposystole and heart collapse. The importance of these circulatory changes in the chronic tuberculous is obvious, because even when the tuberculous process, *per se*, is not active and, therefore, does not impair the physical powers of the individual, these changes may independently aggravate other organic and functional conditions of the patient. This is especially true in extensive pulmonary fibrosis,

even when the tuberculous process may be considered practically healed; nevertheless fibrosis has caused cardiovascular changes that handicap the patient. This condition has considerable importance in the rehabilitation of the tuberculous. It is indispensable, therefore, that a thorough study be made of the cardiovascular reactions of all patients before their discharge.—*Le alterazioni circolatorie nella tubercolosi polmonare, N. Cavarozzi, Riv. di pat. e clin. d. tuberc., November, 1940, 14: 727.*—(*S. L.*)

Visualization of Pulmonary Artery.—Visualization of the pulmonary arterial tree by injection of a 25 per cent solution of sodium iodide was performed in a series of dogs with the object of recording changes occurring during pulmonary embolization and the effect of various drugs on the pulmonary circulation. The right side of the heart, the pulmonary conus and the pulmonary artery and its branches are best seen when an exposure is made three seconds after injection of the solution. Embolization was produced by injection of Martin's solution, a mixture of equal parts of barium sulfate and physiological sodium chloride. The size and site of embolization can be controlled by injecting amounts from 0.5 to 2 cc., the former amount producing embolization of the smaller branches, and the latter producing embolization of the main branches of the pulmonary artery. The effects of occlusion of the main pulmonary artery are a marked dilatation of the right heart, reflux of blood into the superior and inferior cava and a shift of the long axis of the heart. With smaller occlusions the effects are similar but less pronounced. Injection of papaverine intravenously causes a marked increase of vascularity in the pulmonary bed with dilatation of the arterial branches. Dogs could be saved from moderate sized occlusions by the immediate use of intravenous papaverine. The intravenous injection of epinephrine had the opposite effect. There is a marked contraction of the pulmonary vascular bed and a marked increase in pressure in the right side of the heart, as evidenced by quick development of *cor pulmonale* and potent reflux into the venae cavae. The authors conclude that the use of epinephrine in pulmonary embolization is to be condemned, even small doses leading quickly to pulmonary oedema in any condition where pressure in the pulmonary circuit is abnormally high. Similarly, digitalis is contraindicated because it increases the output of the right heart and thus the pressure in the pulmonary circuit. The approved treatment for pulmonary embolization of atropine and papaverine intravenously was proved to be physiologically correct by these experiments.— *Visualization of the Pulmonary Artery during Its Embolic Obstruction, J. Jesser & G. deTakáts, Arch. Surg., June, 1941, 42: 1034.*—(*H. M.*)

Vital Capacity.—The various formulae for prediction of vital capacity are valuable but are subject to grave limitations. Normal individuals may show a significant deviation from the standard value and individuals with definite disease, such as pulmonary tuberculosis, may show no deviation. The most valuable practical method in which vital capacity determinations can be utilized is to establish a vital capacity curve or line for each individual. This can be done by performing vital capacity determinations regularly as part of routine examination. In this manner, the patient's general tendency, as far as vital capacity changes are concerned, is recorded and deviations from this line during illness assume significance. The value of this technique was previously demonstrated in 200 college students. A similar study was carried out on 100 men of middle age with sedentary occupations. The vital capacity was determined annually. The same spirometer was used throughout and at least three trials were made for each determination. At the same time, a routine examination, including electrocardiogram, was done. Chest X-ray films were made when indicated. Persons exhibiting a fall in vital capacity which could be attributed to demonstrable cause, such as heart or pulmonary disease, were omitted. Sixty-three of the men exhibited losses in vital capacity, eleven remained the same and twenty-six gained. The average man lost 33.7 cc. per year, the greatest annual loss being 250 cc. and the greatest annual gain being 200 cc. When analyzed statistically, there were greater deviations in vital capacity

in this group than in younger people and this difference was found to be significant. In no case were the deviations of sufficient magnitude to interfere with the usefulness of the test in diagnosing pneumonia but in diseases exhibiting slight decrease in vital capacity, the test could be applied with confidence only to about one-half of the group as compared to 68 per cent of a group of college age.— *Vital Capacity of the Lungs in Middle Age, J. H. Arnett, Arch. Int. Med., June, 1941, 67: 1129.*—(*H. R. N.*)

Respiratory Values in Children.—The minute volume and the ventilation equivalent have been determined in a series of children from five to sixteen. The ventilation equivalent is a relatively constant figure independent of age and weight of the child. Ninety per cent of all determinations are between 1.92 and 2.58. The minute volume, of course, increases with the age of the child, but if minute volume is calculated per kilogram of body weight, the figure decreases with increasing age. Ninety per cent of the determinations in all age groups combined give a minute volume of 0.08 to 0.18 liters per kilogram of body weight. Comparing his figures to those of others, the author concludes that most figures which have been published for children to date are too high.— *Atmungsgrösse und Atemäquivalent im Kindesalter, H. Wissler, Schweiz. med. Wchnschr., March 15, 1941, 71: 292.*—(*H. M.*)

Respiratory Movements.—The elastic tension of the lungs and the tonus of the respiratory muscles maintain an intimate reflex relationship. The afferent arc of the reflex is the vagus nerve, whereas the phrenic nerve is the principal efferent arc. This has been beautifully demonstrated in experiments on rabbits. When the thorax is opened and the lungs are maximally inflated, a reflex inhibition of tonus affects the diaphragm so that it is relaxed and rises high. When the lungs are maximally deflated through suction, the diaphragm reflexly descends and goes into tetanic contraction. The type of respiration at any given moment is determined by the degree of inflation of the lungs in their midposition. In the normal midposition of the lungs, both inspiration and expiration proceed symmetrically, and the excursions are of moderately small amplitude. When, through disease or experimentally, the lungs are more than normally inflated, the median position of the chest is shifted towards an inspiratory position. Respiration then proceeds with a stress on the expiratory phase, and is of a larger amplitude and less frequent than normally. If the lungs are, for any reason, collapsed, the mean position of the thorax shifts in the direction of expiration. The ensuing respirations stress the inspiratory phase, and these respirations are again deeper and slower than usually. Experimentally, this effect is produced through electrical stimulation of the afferent vagus by currents of various frequencies and strengths. Credit is given to Hess for having done a greater amount of research in this field than anybody since Hering and Breuer.—*Der Bewegungstypus des Atmungsapparates, O. Wyss, Schweiz. med. Wchnschr., March 15, 1941, 71: 290.*—(*H. M.*)

Respiratory Tonus in Artificial Respiration.—The tonus of the respiratory muscles determines pulmonary ventilation. In any method of artificial respiration, pulmonary ventilation will be good if tonus of the respiratory muscles is high. If it is low, the converse is true. Inhalation of oxygen and carbon dioxide mixture greatly increases the respiratory tonus. This procedure is, therefore, of great help in resuscitation. Hyperventilation is to be avoided in artificial respiration because it greatly decreases respiratory tonus.—*The Principle of Respiratory Tonus in Various Applications, Particularly in Artificial Respiration, Y. Henderson, Schweiz. med. Wchnschr., March 15, 1941, 71: 289.*—(*H. M.*)

Oxygen Deficit.—The maintenance of an oxygen supply adequate for the metabolic needs of the body is a function of the lungs, blood and circulatory system. A spirometric method for the determination of oxygen deficit is simple and easily used during rest and exercise. Normally at rest or during light exercise the rate of oxygen consumption is the same whether the subject breathes atmospheric air or air with higher oxygen content. In the presence of an oxygen saturation deficit in the arterial blood the

oxygen consumption rate is greater when breathing high concentrations of oxygen than when breathing atmospheric air. The spirometric method used at the Metropolitan Hospital utilizes a spirometer of the Benedict-Roth type with a capacity of 14 liters. The exercise apparatus is a simple weight and pulley mechanism, by means of which the work performed may be determined in kilogram meters per minute. Spirometric tracings are made with the patient at rest and after light exercise, while the patient is breathing atmospheric air and while he is breathing air with higher oxygen content. If a definite oxygen deficit is not revealed during the examination with the patient at rest, the procedure is then repeated after a given amount of exercise. Normal arterial blood has an oxygen saturation deficit of 6 to 3 volumes per cent during rest or moderate exercise. When oxygen is breathed instead of atmospheric air during rest or light exercise, the arterial blood shows an oxygen saturation of 100 per cent. There is a close parallel between the changes in the oxygen consumption rate and the arterial blood oxygen saturation. Therefore, manifest or latent oxygen deficits may be determined by the spirometric method without repeated arterial punctures to obtain blood for oxygen saturation determinations. In simple circulatory insufficiency maximum oxygen consumption is determined by the limitations of cardiac output. In simple pulmonary insufficiency with diminished pulmonary capacity maximum oxygen consumption is determined by the respiratory reserve. Spirographic tracings may show the following characteristics: (*1*) Pulmonary ventilation and oxygen consumption are the same when the patient breathes atmospheric air or air with a high percentage of oxygen. This indicates the absence of a significant oxygen saturation deficit at the given metabolic level. (*2*) The oxygen consumption rate remains the same but pulmonary ventilation decreases when high oxygen mixtures are substituted for atmospheric air. This indicates that when breathing atmospheric air increased ventilation is necessary to maintain the normal oxygen saturation of the blood. (*3*) There may be a decrease in both pulmonary ventilation and oxygen consumption when oxygen is breathed instead of atmospheric air. (*4*) A manifest oxygen deficit is indicated when the oxygen consumption rate, when breathing high oxygen mixtures, is increased over that found when the patient is breathing atmospheric air. (*5*) A persistent increase in the oxygen consumption rate when the patient is breathing oxygen indicates a persistent oxygen deficit and that the given metabolic level cannot be maintained with atmospheric air without incurring an oxygen deficit. A significant oxygen deficit is indicated when there is a more than 10 per cent increase in the oxygen consumption rate with the breathing of high oxygen mixtures over that found when the patient is breathing atmospheric air. A latent or compensated oxygen deficit is indicated when a decrease in pulmonary ventilation amounting to 10 per cent is found when the patient is breathing high oxygen mixtures.—*Oxygen Deficit in Pulmonary Tuberculosis, D. Matsuzawa, Quart. Bull. Sea View Hosp., April, 1941, 6: 284.*—(*A. A. E.*)

Pulmonary Capacity and Lesser Circulation.—An extensive research with original technique, using specially adapted instruments, was made, involving observations of a group of 10 persons with normal hearts, 10 cardiac patients in a state of full compensation, and 14 patients with decompensated cardiopathies. These elaborate and detailed studies lead to the following general conclusions. In the course of cardiac diseases there occur important modifications in the capacity of the lungs, mostly of an emphysematous type. There is an increase of the residual air, averaging 38 per cent above normal, and a decrease of the vital capacity, averaging 35 per cent below normal. This fact, *per se*, shows an adaptation of the pulmonary function to altered pulmonary circulation. These modifications are at first of a functional character; and as such, are reversible. In chronic decompensation this reversibility is lessened, even when there is a marked improvement of the circulatory conditions; this is because of resultant permanent organic deformities of the lungs. The most important manifestations of respiratory insufficiency in the course of a cardiopathy are found in the volume of air intake, in the

ratio of vital capacity to air intake, and in the volume of air needed to displace 100 cc. of CO_2. While the normal amount of air intake per minute is 6200 liters, in the course of a compensated cardiopathy this is increased about 20 per cent, and in decompensation it may reach an increase of 60 per cent. The ratio of vital capacity to air intake is decreased to 50 per cent of normal in compensated cardiac disease, and to about 35 per cent of normal in decompensation. And the amount of air needed to displace 100 cc. of CO_2 increases about 27 per cent in compensated disease, and 40 per cent in decompensation. An index of the respiratory function in relation to the circulatory function is given by the amount of blood that must go through the capillaries of the lesser circulation in order to eliminate 100 cc. of CO_2. Normally two liters of blood are needed for this function; but 15 per cent more is used in compensated cardiac disease, and up to 50 per cent more in decompensation. In correlating the modifications in the pulmonary circulation and the expansion of the infundibulo-alveolar part of the lungs, which is filled with residual air, we must recognize the effect of a true motility of that part of the pulmonary tissue which acts in the most direct manner towards the gaseous exchange between alveolar air and blood.—*Capacità polmonare e condizioni del piccolo circolo, M. Rigoni, Arch. di pat. e clin. med., May, 1940, 21: 51.*—(*S. L.*)

Residual Air in Normal Women.—Because of its applicability to patients with respiratory distress, van Slyke and Binger's method of dilution of hydrogen without forced expiration was used. A known volume of hydrogen in a hydrogen-oxygen mixture was breathed for six minutes. The volume of nitrogen in the residual air was calculated from the ratio of nitrogen and hydrogen before absorption of the oxygen, and the known volume of hydrogen. This figure divided by 0.791 gives the functional residual air. The true residual air was found by subtracting from the so-called functional residual air (that amount left in the lungs after a normal expiration) the "reserve" air (that expired by a full expiration after a normal expiration). By proper manipulation of the stopcocks it was possible to determine vital capacity and its component parts, functional residual air, and the minute volume and tidal air without disturbing the patient. The gas analysis was done with the apparatus of Shepherd, usually in duplicate. Hydrogen was determined by combustion. Oxygen was absorbed by an alkaline solution of sodium hydrosulphite with sodium beta-anthraquinone sulphonate as catalyst. Corrections for dead space were made. The error of the method varied from 17 to 49 cc. per liter. Fourteen determinations were made on 6 normal women between 18 and 28 years of age under basal conditions. The results were slightly higher than those of other investigators, probably due to the somewhat below-par physical condition of the subjects. Average residual air was 1.34 liters, 30 per cent of the vital capacity. However, the maximum for the latter figure, 40 per cent, was the same as the upper limit of normal given by other authors.—*Determinación del aire residual, con el método de hidrogeno, en las mujeres sanas, R. A. Izzo & H. Chiodi, Publ. d. centro de investigaciones tisiol., Buenos Aires, 1940, 4: 65.*—(*H. B. S.*)

Determination of Residual Air.—A new apparatus for the determination of residual air by dilution of a known volume of hydrogen, without forced respiration (method of van Slyke and Binger) is described. It resembles Knipping's apparatus but has certain advantages. It consists of an 8-liter Benedict-Roth type spirometer with a carefully calibrated bell, balanced by a counterweight equipped with a pen to record respiratory movements on a two-speed revolving drum. The bell moves in a double-walled cylinder containing water to a constant level. The interior cylinder of the spirometer is traversed by two tubes for entrance and exit of gas in order to minimize dead space. The outflow tube leads to a motor-driven turbine, submerged in an oil-bath to prevent leakage, which regulates the circulation of gas through the system. From the turbine the gas passes across a container of soda lime to take up carbon dioxide and then past a small exit tube for taking samples for analysis. Then comes a 4 or 5 mm. glass stopcock and then a U-tube whose other limb leads back to the spirometer, closing the circuit.

This second limb holds a thermometer and a side tube for the introduction of gas. In the bend of the U is attached a slightly inclined tube with a three-way stopcock connecting to the mouth-piece. The apparatus is entirely of metal with only one rubber connection between the glass stopcock and the U-tube. Washing the apparatus is quickly carried out. Repeated analyses of the gas remaining in the apparatus reveal the existence of a small constant dead space. This apparatus simplifies determinations so that multiple determinations are readily carried out.—*Dispositivo para la determinacion del aire residual, H. Chiodi, Publ. d. centro de investigaciones tisiol., Buenos Aires, 1940, 4: 59.*—(*H. B. S.*)

Respiratory Exchange.—This paper deals with the cessation of respiratory exchange as encountered in anaesthesia. The author distinguishes three types of cessation of respiration. If there is no obstruction, respiratory efforts may cease from overdose of anaesthetic, excessive elimination of carbon dioxide, reflex stimulation of the carotid sinus, or paralysis of the muscles of respiration. The treatment of this emergency requires the immediate institution of efficient artificial respiration, which can be accomplished by various means. If the failure of respiration is due to obstruction, as may be seen in swallowing of the tongue, foreign bodies, laryngospasm or external pressure on the neck, the treatment consists of immediately removing the obstruction. Prompt recognition of the complication is essential. This is facilitated by the fact that respiratory effort persists as evidenced by abdominal breathing. The establishment of a pharyngeal airway is usually helpful when the obstruction is in the upper passages; obstructions lower down have to be dealt with by appropriate means. When respiratory effort ceases during the course of obstruction of respiration, the first step is to clear the passages. If respiration is not resumed, artificial breathing is to be employed. The administration of stimulants is not considered judicious in cessation of respiratory exchange.—*Cessation of Respiratory Exchange, W. Cassels, Arch. Surg., October, 1941, 43: 568.*—(*H. M.*)

Pathological Physiology of Asthma.—In an asthmatic attack, vagotropic or H-substances are liberated by an antigen-antibody reaction or by a nervous reflex mechanism. The resolution of an asthmatic attack is an active process in which a vagotonic phase is succeeded by a sympatheticotonic phase, or expressing it differently, an adrenergic reaction follows upon a histaminergic or cholinergic reaction. Acidosis caused by retention of blood gases occasionally initiates resolution. More often adrenalin is produced more slowly by changes in the blood sugar. The hyperglycaemia of the crisis induces a hypoglycaemia which in turn activates the adrenal medulla and adrenalin is secreted. When treating an asthmatic attack, hypoglycaemia may be produced by the injection of insulin, or by the administration of hypertonic glucose, because this is always followed by a hypoglycaemic reaction.—*La physio-pathologie de la crise d'asthme, A. Epstein, Schweiz. med. Wchnschr., February 15, 1941, 71: 149.*—(*H. M.*)

Oxygen Uptake of Tubercle Bacillus.—Although there have been many studies on the factors affecting the growth of the tubercle bacillus, the oxidative metabolism of these bacteria has received comparatively little attention. In this study the effect of various substances on the oxygen uptake of the bovine tubercle bacillus (B_1) was determined. The inability of carbohydrates, amino acids, and other acids such as lactic, citric and succinic to affect the O_2 uptake of the tubercle bacillus was confirmed. All the aldehydes tested increased the O_2 uptake. Furfural and benzaldehyde had the greatest effect. The sodium salts of the lower fatty acids and the lower alcohols except ethyl and capryl also increased the uptake. The sodium salts of salicylic and benzoic acids markedly increased the uptake; p-hydroxybenzoic had a small effect and m-hydroxybenzoic, p-amino benzoic, 3,5 dinitrosalicylic acids and methyl salicylate had no effect. Acetylsalicylic acid was effective only after hydrolysis of the acetyl group. The O_2 uptake was proportional in certain ranges to the concentration of the compound added but no definite endpoints were obtained. The O_2 uptake was always accompanied by CO_2

production. The O_2 uptake was dependent on the bacterial concentration but was not proportional to it. The evidence indicates that the substances were acting as substrates undergoing oxidation and not as accelerators of the normal bacterial metabolism. But because of the lack of definite endpoints and because proportional concentration curves could in some cases only be obtained at rather low concentrations, the possibility remains that some of these compounds may have acted as catalysts. This seems unlikely because there is no common chemical or physical property of these compounds which might influence the bacterial enzymes or the permeability of the capsule in the same way. The assumption that they are all substrates does not necessarily mean that they are normal metabolites of the cell. The results suggest the probability that substances of similar chemical constitution may be important in the normal cellular metabolism. The effect of these compounds on the growth of the bacteria is being tested.—*The Effect of Various Substances on the Oxygen Uptake of the Tubercle Bacillus, F. Bernheim, J. Bact., March, 1941, 41: 387.—(F. G. P.)*

Demonstration of Tubercle Bacilli by Fluorescence.—A comparison was made of the efficiency of the Ziehl-Neelsen technique and fluorescent microscopy in demonstrating tubercle bacilli in 1000 specimens. The usual procedure yielded 172 positive findings while fluorescent microscopy demonstrated tubercle bacilli in 234 instances. The latter procedure therefore yielded a 36 per cent increment of positive results. Furthermore, less time is necessary to demonstrate the bacilli because, with fluorescent microscopy, the smears are examined at lower magnification than with the ordinary procedure and hence a greater area can be examined in a given time. However fluorescent microscopy does not differentiate true tubercle bacilli from smegma bacilli or other alcohol-acid fast microörganisms. This differentiation can be effected in the case of smegma bacilli by preliminary treatment with chloroform and antiformin.—*Über den fluoreszenzmikroskopischen Nachweis von Tuberkelbazillen unter besonderer Berüsichtigung andere alkohol-säurefester Bakterien, K. Luz & B. Meding, Zentralbl. f. Bakt. Parasit. u. Infekt. Originale, May, 1940, 145: 500.—(M. B. L.)*

Tubercle Bacilli in Gastric Lavage.—Patients who did not expectorate, were asked to bring up sputum by coughing and hawking. In 273 such cases cultures were made from the gastric lavage and from the "expectorate." In 89 cases the gastric lavage was positive; and 29 of these were "expectorate"—positive. In 5 cases the "expectorate" gave a positive and the gastric lavage a negative result. It is suggested to divide the cases with a positive gastric lavage in three groups, according to the number of colonies: Group I, more than 70 colonies. Group II, 20-70 colonies. Group III, less than 20 colonies. Group I corresponds fairly well to the cases in whom the "expectorate" is positive on direct microscopy, group II to the cases in whom the "expectorate" is positive on culture. It is believed that patients belonging to group III play an insignificant rôle in the spreading of the infection.—*On the Significance of Demonstration of Tubercle Bacilli by Gastric Lavage, with a Special View to the Danger of Infection, J. Holm & K. A. Jensen, Acta. tuberc. Scandinav., 1941, 15: 47.—(G. C. L.)*

Tubercle Bacilli in Gastric Lavage.—The author advocates examination of the gastric contents for tubercle bacilli in cases where sputum examination is negative. The percentage of finding bacilli in gastric juice is much greater than in the sputum. Gastric lavage is of special value in children who do not expectorate, and in young girls and women who do not want to cough for aesthetic reasons. In insidious cases where respiratory symptoms are absent, the gastric lavage is frequently positive. The examination is also of importance in determining the infectiousness of apparently cured cases, and in differential diagnosis of cases frequently labelled as chronic bronchitis.— *Valeur du tubage gastrique à jeun pour la recherche des bacilles de Koch, M. Gilbert, Schweiz. med. Wchnschr., May 10, 1941, 71: 609.—(H. M.)*

Open Tuberculosis without Sputum.—Tubercle bacilli can be demonstrated in the gastric

juice of infants and small children in a large percentage of cases of primary tuberculosis. In postprimary tuberculosis of children and adolescents, bacilli are found in gastric specimens in the presence of a negative sputum and, unless the gastrics become negative under pneumothorax or other therapy, the prognosis is unfavorable, although sputum may be entirely lacking. From a statistical point of view, this "potentially" open tuberculosis has to be put into the same class as open tuberculosis. There is no agreement of opinion whether children whose only sign of activity is a positive gastric should be segregated. Those who believe that universal infection of the population is necessary for immunity state that children with positive gastrics should not be segregated. The author, however, believes that clamping down on this source of contagion will aid in the conquest of tuberculosis.—*Über fakultativ offene Lungentuberkulose (Nachweis von Tuberkelbazillen bei Fehlen von Auswurf), J. Burckhardt, Schweiz. med Wchnschr., May 10, 1941, 71: 604.*—(*H. M.*)

Tubercle Bacilli in Faeces.—A new method for demonstrating tubercle bacilli by smear of a sediment obtained from the faeces is described. The coarse parts of the faeces are mechanically removed and the fats are completely dissolved. The method is very simple and reliable. Even very small amounts of swallowed tubercle bacilli can be found microscopically. This examination of the faeces gives better results than the examination of the gastric juice. Tubercle bacilli can be found in the faeces even a long time after complete disappearance of sputum. It is believed that a pneumothorax therapy is effective if not only sputum but also faeces are negative for tubercle bacilli.—*Über ein einfaches und zuverlässiges Verfahren zum Nachweis von Tuberkelbazillen im Stuhl, J. E. Wolf & V. Narmont, Ztschr. f. Tuberk., February, 1941, 86: 33.*—(*G. C. L.*)

Types of Tubercle Bacilli.—The proportion of the numbers of human and bovine colonies cultivated from mixed infections may vary considerably within such a short period as one week. Two cases are presented in whom a bovine pulmonary tuberculosis turned into a human pulmonary tuberculosis. Examples are given of the atypical properties as to the growth and virulence of bovine strains obtained from mixed infections. These bovine strains show great tendency to dissociation in a pure culture. Mixed infections are probably not only due to superinfection with the human type, but also to dissociation of the bovine type in the human organism.—*Studies on the Types of Tubercle Bacilli Isolated from Man. VI. Supplementary Studies on the Cases Described in Report V and Some New Cases of Mixed Infections, K. A. Jensen & Vera Lester, Acta tuberc. Scandinav., 1941, 15: 15.*—(*G. C. L.*)

Type of Tubercle Bacilli in Tuberculous Meningitis.—The author investigated the types of tubercle bacilli present in a series of 48 cases of tuberculous meningitis, 26 of which came from Budapest and 22 from the Hungarian provinces. The diagnosis of type was based on the colonial characteristics, on suitable culture media and pathogenicity for rabbits. The human type was eugonic in growth and the colonies were dry and yellowish, while the bovine type was dysgonic in growth and the colonies appeared small and moist and were readily suspended. Colonial characteristics were not constant enough for differentiation, since eugonic bovine and dysgonic human types were observed. Confirmation of the type of tubercle bacillus was made by injecting rabbits intravenously with 0.01 or 0.02 mg. of the initial culture. Of the 48 specimens examined 42 proved to be human and 6 bovine type. The bovine type occurred most frequently in patients under one year of age and infrequently in those over seven years.—*Die Rolle des bovinen Typus bei der Entstehung der Meningitis tuberculosa, J. v. Vasarhelyi, Zentralbl. f. Bakt., October, 1940, 146: 195.*—(*J. D. A.*)

Chromogenic Acid-fast Bacteria from Hog.—From a tuberculous submaxillary lymph node of a hog there was isolated an acid-fast organism which appeared as a rounded bacillus or coccus measuring about 0.5 micron. The colonies which appeared after two weeks of incubation were smooth, hemispherical, pale yellow and soft. Growth on both solid and liquid media was favored by the addition of glycerine. The

culture grew diffusely in liquid media and formed a thin pellicle on the surface. After four weeks' incubation the medium had a reaction of pH 8.5. Guinea pigs infected intravenously died five days later, and numerous acid-fast organisms were found intra- and extracellularly. Phagocytosis by mononuclear cells was most marked in the spleen and liver. Among the infected guinea pigs and rabbits that survived for thirteen days, numerous small tubercles were noted in the spleen and liver, while a chicken that was killed four months after inoculation showed no lesions, and no acid-fast organisms were demonstrable in the organs.—*Ueber einen chromogenen und pathogenen säurefesten Stamm, E. Groh, Zentralbl. f. Bakt., September, 1940,* ***146:*** *163.—(J. D. A.)*

Immunity without Allergy.—Some investigators believe that allergy and immunity in tuberculosis are two processes between which no strict correlation exists; others believe in such a correlation. The name "iathergic immunity" is given to the immune state which remains intact after the allergic state has been abolished either spontaneously or artificially by means of desensitization with tuberculin. In previous animal experiments it had been shown that elimination of the allergic condition had increased resistance. Subsequent experiments were done to show the effect of immunization against tuberculous infection without the animals ever being allergic. Guinea pigs were immunized and sensitized by subcutaneous injection of killed BCG combined with solid paraffin. A group of these animals was kept desensitized by injections of 100 mg. undiluted tuberculin three times weekly beginning one week before the injection of the BCG-paraffin-mass and continued throughout the experiment. Fifty-four days after vaccination every guinea pig was injected intraperitoneally with highly virulent human tubercle bacilli. Most of the desensitized animals retained the BCG-paraffin focus. By studying the body weights and the volumes of the organs at autopsy, by determining the number of viable tubercle bacilli in the organs, by macroscopical and histological examinations it could be shown that the tuberculo-resistance was higher in the desensitized animals than in the allergic animals. Thus it was demonstrated that immunity in tuberculosis can be present without allergy.—*Iathergic Immunity in Experimental Tuberculosis (A lecture delivered at the Chr. Michelsen Institute's Annual Meeting, March 14, 1940), K. Birkhaug, Bergen, 1940.—(G. C. L.)*

Blood Cells in Iathergic Guinea Pigs.—Seventy-five normal guinea pigs were divided into three equal groups. These were called respectively (a) iathergic-immune, (b) allergic-immune, and (c) allergic control. Group (a) and (b) were each inoculated with 100 mg. BCG combined with 1 cc. solid paraffin intramuscularly. The animals of the iathergic-immune group were desensitized by repeated tuberculin injections. Fifty-four days after the BCG-vaccination each of the animals was intraperitoneally injected with 0.0001 mg. human tubercle bacilli. Weekly haematological studies were done in ten animals from each group. The iathergic-immune group showed the smallest and slowest decrease of haemoglobin and erythrocytes. The total leucocyte counts in the allergic-control group fell significantly below those in the other groups. There were no significant differences in neutrophiles, basophiles and eosinophiles. The lymphocytes remained stationary between 31 and 40 per cent in the iathergic-immune group, decreased to 16 per cent in the allergic-immune group and to 9 per cent in the allergic-control group. The number of monocytes increased in the allergic-immune and allergic-control groups and remained fairly constant in the iathergic-immune group. The Arneth indices of increased immature forms were stationary in the iathergic-immune animals, the allergic-control group showed a high elevation and the allergic-immune group held an intermediate position. The monocyte-lymphocyte ratio was the most sensitive index for the degree of infection. The Medlar-Crawford leucocytic index seemed to be less sensitive. The results of the haematological studies substantiated the proposition that tuberculo-immunity can exist without tuberculo-allergy.—*Allergy and Immunity (Iathergy) in Experimental Tuberculosis. VII. Variations in the Blood Cells of Guinea Pigs Prevented from ever Becoming Allergic during*

Immunization with BCG-in-solid-Paraffin and during a Virulent Infection, K. Birkhaug, Acta tuberc. Scandinav., 1941, 15: 59.—(*G. C. L.*)

Antigenicity of Tuberculins.—The antigenic, sensitizing, haptene and protective value of the phosphatide fraction of the tubercle bacillus, bacillary bodies after extraction with ether, Old Tuberculin and purified tuberculin was investigated, while guinea pigs infected with BCG served as controls. The different preparations were injected subcutaneously, and followed twelve days later by an intraäbdominal injection. Serological examinations were made twelve and fourteen days after the injection, while the tuberculin tests were made after twenty-one and forty-two days. For the complement fixation reaction, formic-acid-ethyl extracts and acetone extracts of tubercle bacilli were used, as well as the Witebsky antigen. The tuberculin tests were made with 50 per cent Old Tuberculin. No antibodies were demonstrable following the injection of the phosphatide fraction of the tubercle bacillus, nor did this fraction serve as antigen in demonstrating antibodies. The local inflammatory reaction following the injection of this fraction was not specific in character. Guinea pigs treated with ether extracted bacillary bodies showed complement fixing antibodies, demonstrable not only with formic-acid-ethyl extract and acetone extract but also with Old Tuberculin. In most instances the sensitivity to tuberculin was slight. Antibody production following the injection of the bacillary bodies was earlier and more marked than that noted among the BCG treated controls, while tuberculin sensitivity was most marked in the BCG treated animals. Guinea pigs injected with Old Tuberculin showed slight antibody formation, best demonstrated with the acetone extract and with the formic-acid-ethyl extract and to a lesser degree with Old Tuberculin. Slight sensitivity to tuberculin was noted. The purified tuberculin used in these studies gave no protein or ninhydrin reaction. Following its injection into guinea pigs there were noted complement fixing bodies demonstrable with the acetone extract and formic-acid-ethyl extract and to a slight degree with the Witebsky antigen but not with the purified tuberculin antigen. These antibodies were demonstrable twelve days after treatment and were more marked after twenty-four days. The antigenicity of this fraction resembled that of the extracted bacillary bodies, while the production of antibodies occurred more promptly than among the BCG vaccinated animals. Definite sensitization to old tuberculin was observed in these animals. The phosphatide fraction, Old Tuberculin and bacillary bodies did not protect guinea pigs against reinfection with virulent tubercle bacilli. Slight protection was obtained with the purified tuberculin while the BCG vaccinated animals were definitely protected as indicated by longevity. The author concludes that the phosphatide fraction has no antigenic or haptene properties and that there is no correlation between the *in vivo* and *in vitro* properties of the antigen.—*Antigene und allergene Wirkung einiger Tuberkulinpräparate vergleichen mit BCG, Th. van Elsbergen, Zentralbl. f. Bakt., July, 1940, 146: 70.*—(*J. D. A.*)

Sensitization to Tuberculin.—In 162 patients with and without active tuberculosis intracutaneous tuberculin injections were given. When a second injection was given after one to two weeks 104 patients (64 per cent) showed signs of sensitization; they responded to a lower concentration or with a shorter latent period or an increased reaction. Signs of sensitization were found in patients with active skin tuberculosis as well as in patients without manifest tuberculosis of skin or other organs. They could be observed in patients with high and in patients with low tuberculin sensitivity. The sensitization reaches its height usually after one month and can persist through several months. —*Untersuchungen über die durch die intrakutane Tuberkulin-reaktion hervorgerufene Sensibilisierung, R. Th. Bjoernstad, Acta tuberc. Scandinav., 1941, 15: 146.*—(*G. C. L.*)

Specificity of Tuberculin Tests.—The specificity and sensitivity of the intracutaneous tuberculin reaction was determined on a group of 1482 persons ranging in age from two to nineteen years who one year previously had failed to react to tuberculin and who were then vaccinated, intracutaneously, with BCG vac-

cine. The tuberculin reaction observed in this group was compared with that observed in a group of 1312 persons of comparable age who had failed to react to tuberculin one year previously but who were not vaccinated, and with a group of 6901 persons from the general population who had undergone a natural tuberculous infection as indicated by a positive tuberculin reaction. Using the same preparation of purified protein derivative tuberculin as that used in the original tests, it was found that 93 per cent of those vaccinated with BCG reacted to either 0.00002 or 0.005 mg. of PPD. Among the unvaccinated group, negative to tuberculin the preceding year, 13 per cent reacted, while among the general population 48 per cent reacted to one or the other dose. The degree of sensitivity to tuberculin was indicated by the fact that among the BCG vaccinated group, 39 per cent of those who were positive reacted to 0.00002 mg. of tuberculin, while among the unvaccinated group 57 per cent of those positive reacted and among the general population 89 per cent of those who were positive reacted to 0.00002 mg. The intensity of the specific inflammatory reaction following the injection of tuberculin was most marked among the general population and among the unvaccinated group and least marked among those vaccinated with BCG. Reactions of slight or doubtful significance were observed in 12 per cent of those injected with 0.00002 mg. of tuberculin and in only 0.6 per cent of the unvaccinated and general population groups. These reactions invariably became positive following the injection of 0.005 mg. of tuberculin. Slight or doubtful reactions to the intracutaneous injection of 0.005 mg. of tuberculin occurred in 2 per cent of the BCG vaccinated cases and in the general population, and in 7 per cent of the unvaccinated cases. The incidence of these doubtful reactions was highest in the age period of ten to fourteen years. The authors conclude that the specific nature of the tuberculin reaction is indicated by the fact that 93 per cent of cases previously negative to tuberculin became positive following vaccination with BCG. Doubtful or slight reactions following the injection of 0.005 mg. of PPD are probably of nonspecific character.—*The Specificity and Sensitivity of the Tuberculin Reaction following Vaccination with BCG, J. D. Aronson, Erma I. Parr & R. M. Saylor, Am. J. Hyg., March, 1941, 33: 42.*—(*J. D. A.*)

Tuberculin Tests.—That the number of reactors to tuberculin has decreased among school children in a Montreal clinic is demonstrated by statistics covering the years 1933 to 1939. The Mantoux test was used and the number of tests varied between 556 and 808, with the percentage of reactors falling from 57 per cent in 1933 to 33.4 per cent in 1939. The explanation for this drop is given as an intensified antituberculosis campaign associated with improved living conditions in some districts. A further study was made of student nurses in two classes in a local hospital, following each through the three years of training, with almost identical results. There were 72 students in each class, of whom 18 were reactors on admission while the nonreactors numbered 51 and 54 in the respective classes. On graduation there were slightly over 50 reactors and an average of only 15 nonreactors, with 6 clinical cases of tuberculosis in the first class and 4 in the second, all of whom were nonreactors on admission. Tuberculin tests and X-ray films were repeated on all tuberculin-negative nurses every six months and the author feels that had BCG been given to nonreactors there would have been no active cases encountered. A survey of medical students at McGill University is also being carried out but no final results are yet reported. Comparing the percutaneous or inunction tuberculin test with the intracutaneous and patch tests has convinced the author that the results are similar except when the weaker solutions of tuberculin are used. Thus he feels that inunction and patch tests are more suitable for children but that the intracutaneous test should be used in adults. In this latter test he recommends an initial dose of not more than 0.1 mg. which may be followed by 1 mg. and then 10 mg. at intervals of forty-eight hours, should there be negative results.—*The Comparative Value of Various Tuberculin Tests in Children, Medical Students and Nurses-in-Training, H. P. Wright, Canad. M. A. J., January, 1941, 44: 44.*—(*W. G. C. M.*)

Tuberculin Sensitivity.—The sensitivity to tuberculin was tested with intracutaneous injections of PPD. The doses were from 1/100 billionth of a milligram in 0.1 cc. to 1.0 mg. in 0.1 cc. of physiological saline solution. The concentration of tuberculin increased ten times with each succeeding test. The percentage of positive reactors is plotted against dosage which gives the so-called sensitivity curve. The sensitivity curves of various population groups are compared. The sensitivity of the various groups increases with the proportion of persons in the group who have had known contact with tuberculosis. Tuberculous adults show a sensitivity curve similar to that for tuberculous children. No difference in tuberculin sensitivity in the tuberculous adults exists according to sex, race, age, nor is there a difference between patients with minimal tuberculosis, moderately or far advanced tuberculosis. Almost all persons tested react to tuberculin if sufficiently large doses are injected. Those who react only to large doses of tuberculin are those without known contact with the tubercle bacillus. It is assumed that these reactions are nonspecific. Those who react to very small doses either have tuberculosis or a history of contact. To detect the patients with active tuberculosis the dosage of tuberculin should not be greater than 1/10,000 mg.—*Quantitative Studies of the Tuberculin Reaction. I. Titration of Tuberculin Sensitivity and Its Relation to Tuberculous Infection, M. L. Furcolow, Barbara Hewell, W. E. Nelson & C. E. Palmer, Pub. Health Rep., May 23, 1941, 56: 1082.*—(*G. C. L.*)

Patch Tests.—The efficacy and advantages of the patch test in tuberculin testing of children is well established, especially in contact schemes. Its use, however, in adolescents and adults has not been proven and forms the subject of this paper. The comparative values of the Mantoux test and the patch test were studied on 1400 subjects. Lederle (Vollmer) patch material and *tuberkulinsalve* as prepared by the Danish State Serum Institute were used in patch testing. The patch test (Lederle or Danish) gave a high degree of agreement with the Mantoux test in subjects under sixteen years of age and became less reliable thereafter. Of 170 adults aged sixteen to fifty with quiescent pulmonary tuberculosis 13 (7.6 per cent) failed to react to two patch tests. Of 39 adults aged sixty or more there were 3 (7.7 per cent) falsely negative patch tests. Unless checked by intracutaneous tests when the results of two patches is negative, the patch tuberculin test appears unreliable in adolescents and adults. False positives are very rare. *Tuberkulinsalve* was adopted as the patch test of choice.—*The Percutaneous Tuberculin Test, F. D. Hart, Lancet, March 29, 1941, 240: 414.*—(*J. B.*)

Tuberculin Reactions in Cattle.—Acid-fast organisms have a group antigen which causes a nonspecific sensitization. As the incidence of tuberculosis in cattle has decreased in the United States, the nonspecific types of reaction have become important economically. Johne's disease has increased in prevalence and has been found to be responsible for reactions for which no lesions of tuberculosis were demonstrable at autopsy. Three herds consisting of 347 cattle were tested with johnin and tuberculin. Of these, 24 reacted to the johnin. Nine of the 2 johnin reactors reacted to the tuberculin test also. None of the 313 johnin negative cattle reacted to the tuberculin test. No lesions of tuberculosis were found on autopsy in any of the 9 animals reacting to both tests. All 9 had lesions considered typical of Johne's disease and acid-fast organisms indistinguishable from the *Mycobacterium paratuberculosis* were found in stained smears from the intestinal mucosa of 8 animals of this group.—*Tuberculin Reactions in Cattle Infected with Mycobacterium Paratuberculosis (Johne's Disease), H. W. Johnson, J. G. Milligan & B. F. Cox, J. Am. Vet. M. A., August, 1941, 99: 115.*—(*T. R. J.*)

Serology in Tuberculosis.—While much progress has been made in the study of the serology of tuberculosis, this field has not received the attention it deserves. There are definite differences between the immunological characteristics of tuberculosis and many of the acute diseases. However, serological diagnosis can be of great value in tuberculosis. In the various pneumonoconioses, the problem of diagnosis of a complicating pulmonary tubercu-

losis frequently arises. In a series of 178 cases of pneumonoconiosis, it was possible to make a diagnosis of complicating tuberculosis by history, physical examination and roentgen study in 103 patients. When bacillary studies of the sputum were carried out, it was found that all 178 patients had tuberculosis. In 176 of these cases, specific antibodies to tuberculosis were demonstrated, thereby illustrating the high accuracy of serodiagnosis. In 163 other cases of pneumonoconiosis, tubercle bacilli were not found in a large portion of those cases in whom clinical tuberculosis was suspected. However, serological studies showed specific antibodies to the tubercle bacillus in 93 cases. In almost all of these cases in which the diagnosis was first made by serological methods, the diagnosis of tuberculosis was subsequently established either by definite clinical findings or by the later appearance of tubercle bacilli in the sputum.—*Die Serodiagnostik der Tuberkulose in ihrer Bedeutung für die Differentialdiagnose der Pneumokoniosen, insbesondere der Silikose und der Lungentuberkulose, W. Heine, Klin. Wchnschr., November 30, 1940, 19: 1227.*—(*H. R. N.*)

Tuberculin Reaction and BCG Vaccination.—In 5 females, who did not react to an intracutaneous injection of 0.1 cc. of a 1 per cent tuberculin solution, another one or two tuberculin injections with the same concentration and quantity were made in the same spot. At the same time the individuals were vaccinated with BCG. One to two months after the BCG-vaccination erythema and infiltration appeared at the site where the tuberculin injections had been done.—*Beobachtungen ueber die Tuberkulinreaktion bei BCG-Vakzination, A. Kristenson, Acta tuberc. Scandinav., 1941, 15: 110.*—(*G. C. L.*)

Seal Oil in Antituberculous Vaccination.—Forty guinea pigs were given ten weekly intraperitoneal injections of a glycerol broth suspension of heat-killed tubercle bacilli. Another 40 guinea pigs received in addition to and during vaccination ten weekly intraperitoneal injections of seal oil. Six to ten weeks after the last injection all 80 treated plus 40 normal guinea pigs were infected intracutaneously with 0.001 mg. if a virulent human strain of *M. tuberculosis*. The extent of visceral tuberculosis was compared in the survivors three months after infection. All vaccinated animals showed less tuberculosis than the controls. There was greater protection against tuberculous infection in the guinea pigs that received seal oil simultaneously with the heat-killed tubercle bacilli. Another series of 10 guinea pigs were given eight weekly intraperitoneal injections of glycerol broth and seal oil. Six weeks after the last injection the 10 glycerol broth-seal oil animals plus 6 normal guinea pigs were infected as in the previous experiment. The extent of visceral tuberculosis was determined in the survivors three months after infection. It was found that intraperitoneal treatment with the combined glycerol broth-seal oil diminishes the development of tuberculous infection, although the protection is inferior to that given by vaccination combined with seal oil treatment.—*The Effect of Seal Oil and Glycerol Broth Treatment on Antituberculous Vaccination, W. Pagel, J. Path. & Bact., May, 1941, 52: 383.*—(*H. J. H.*)

Diagnosis of Tuberculosis.—The three great aids in diagnosing active tuberculosis are physical examination, X-ray and laboratory determinations. To evaluate the relative importance of these procedures, the author divides active pulmonary tuberculosis into four groups. His first group is active tuberculosis with the danger of bronchogenic spread. Here, the finding of tubercle bacilli in the sputum is of paramount importance. Physical and X-ray examination share the second place in determining activity in this type of disease, and determination of the sedimentation time may not be of any help. In the second group, active tuberculosis with the danger of haematogenous spread, physical examination is of greater importance than all other diagnostic means. In the author's experience, careful percussion of the chest always reveals pleural adhesions which are pathognomonic of haematogenous tuberculosis. X-ray examination may not be of help in these cases. Palpation and percussion of the spleen may detect a characteristic enlargement. The edge of the spleen is sharp like a knife. If the spleen is not enlarged, no

haematogenous dissemination has presumably taken place within the last three weeks of examination. Careful determination of body temperature over several days is helpful in this group. The third group shows activity with bland or toxaemic spread. This group comprises all diseases with productive, non-caseating manifestations, such as Boeck's sarcoid, Darier-Roussy's sarcoid, lupus pernio etc. The most important characteristic of this group is the tuberculin anergy of the skin. The tuberculin reaction is also of importance in the last group which shows activity with distant neurogenic manifestations. X-ray and physical examination often reveal only an old, apparently healed tuberculosis. The complaints of these patients are usually referred to the abdominal organs. They are due to irritation of autonomic nerves in the mediastinum, and this is due to recrudescence of the old tuberculosis. The diagnosis can only be made after exclusion of organic disease of the gastrointestinal tract. In these cases the tuberculin test is positive in high dilutions.—*Die Leistungsfähigkeit und die Grenzen der Röntgenuntersuchung, der physikalischen Diagnostik und der Laboratoriumsmethoden bei der Erkennung einer aktiven Tuberkulose, W. Neumann, München. med. Wchnschr., January 31, 1941, 88: 134.*—(*H. M.*)

Fluoroscopy.—More recent experience with the improved Patterson-"B" fluoroscopic screen has indicated a higher degree of accuracy for fluoroscopic examination. Thus it seemed desirable to determine the accuracy of the method as used routinely in the clinic and to ascertain as well the limits of its accuracy in the detection of smaller lesions sought in epidemiological studies. This study includes 1021 duplicate fluoroscopic and film examinations made from June 1938 to May 1940, these examinations being limited to contacts and to those presenting abnormalities in routine fluoroscopic examination. The examining physicians for purposes of comparison were classed in three groups: (1) those having special training in X-ray and long experience in fluoroscopy, (2) staff physicians with considerable experience in fluoroscopy but no special training in X-ray interpretation and (3) fellows and graduate students receiving short periods of training. The abnormalities seen were classified as definite, probable or possible (slightly suspected). Forty-eight cases were considered unsuitable for the study, leaving 973 patients. Infiltrations were considered absent or unlikely in 692 patients and this diagnosis was confirmed by film examination in 668 or 96.6 per cent. A definite pulmonary lesion was thought to be present on fluoroscopic examination in 240 patients and was confirmed by X-ray films in 237 or 96.7 per cent. In the remaining 35 patients where infiltrations were thought probably present the film examination revealed definite lesions in ten or 28.6 per cent. There were but slight individual variations, physicians in group one being 99 per cent accurate in excluding tuberculosis, physicians in group two being 94.9 per cent accurate, while the least experienced physicians were 97.3 per cent accurate. In only four instances were significant lesions not recognized and results satisfactory for clinical purposes were obtained even in obese patients.—*Accuracy of Fluoroscopy in the Detection of Pulmonary Tuberculosis, H. I. Israel & H. W. Hetherington, Am. J. M. Sc., February, 1941, 201: 224.*—(*G. F. M.*)

Fluoroscopy and "Spot" Roentgenograms in Early Tuberculosis.—The skepticism existing at present regarding the limitation of fluoroscopy in making visible small parenchymal lesions is unwarranted. Actually in trained hands fluoroscopy is more efficient in finding minimal lesions than are single or stereoscopic films. This is particularly true of small infiltrates at the extreme apices, at the lung periphery, and the clavicular areas which are frequently obscured by the bony framework of the thorax. Likewise, thickening of the apical pleura is much more frequently discernible on fluoroscopy than on the film, because of overlying first and second ribs. Blood vessels simulating calcified tubercles are easily distinguishable by fluoroscopy, and diaphragmatic adhesions are also more easily demonstrated. A small percentage of individuals are too large for adequate fluoroscopy. In approximately one case of every 4 in which small calcifications in the hila are demonstrable on

the film, fluoroscopy will fail. The examiner should be well accommodated to darkness before performing the fluoroscopy. He should establish a routine for himself. With the shutters wide open, a general survey of the lungs is made. With the shutter arranged to expose a 3 inch strip of lung, homologous parts of the 2 lungs are compared. Lesions are most easily brought into view by turning the patient from side to side as the screen is slowly elevated and all parts of the lung are brought successively into view. Closer inspection of the apices and clavicular and subclavicular regions should be done with the shutter of the diaphragm so regulated that only small parts of the lung can be examined successively. The extreme apices can best be brought into view on deep expiration and by tilting the thorax either anteriorly or posteriorly. To make available a permanent record of the image seen on the fluoroscopic screen "spot" roentgenograms are recommended. They have a distinct advantage over routine films because they may be taken from the position or positions to show the exact location and type of lesion to best advantage.—*The Advantages of Roentgenoscopy and Roentgenoscopic "Spot" Roentgenograms in the Diagnosis of Early Pulmonary Tuberculosis, R. H. Stiehm, Am. J. Roentgenol., June, 1941, 45: 871.*—(*W. H. M.*)

Diagnosis by X-ray.—On the basis of roentgenograms of the chest together with histories and physical findings, a series of cases were diagnosed as pulmonary tuberculosis. All cases were subsequently proven to be nontuberculous. The cardinal symptoms of pulmonary tuberculosis, cough, haemoptysis, thoracic pain, loss of weight, night sweats and fever were present in varying combinations and in varying degrees in all the cases mentioned which are common to so many pulmonary diseases, but which are not, in themselves, diagnostic. Careful attention to details of these symptoms is of great value in arriving at a correct diagnosis. A roentgenogram made on a bronchopneumonia patient on the day of admission with a temperature of 104 F., showed miliary-like infiltration of both lungs, but without visible lymph node enlargement. A roentgenogram made three weeks later, after the temperature had remained below 100 for a week, showed complete clearing of both lungs. In several other types of bronchopneumonia a differential diagnosis must be deferred until the progress of the lesions can be determined by a comparison of successive roentgenograms. In a case of lung abscess the roentgenogram showed dense infiltration in the upper half of the right lung with areas of rarefaction suggesting excavations. Repeated sputum examinations failed to show acid-fast bacilli. After four weeks of hospitalization, a roentgenogram showed such marked clearing that lung abscess was diagnosed and the patient was discharged as nontuberculous. Postpneumonic lung abscesses are usually seen near the hilum, but they may occur in either the basal or apical region; excavation may be slow and the sputum may not be foul. X-ray films of multiple haematogenous abscesses often very closely resemble diffuse exudative tuberculosis with cavity. Through the instillation of lipiodol, another case with fibrosis scattered in the upper third of the right, was diagnosed as bronchiectasis. A perifocal irritative reaction may follow this diagnostic procedure which in the roentgenogram strongly resembles miliary tuberculosis or an acute extension of tuberculosis infection such as is seen after pulmonary haemorrhage. When such conditions are present, roentgenograms and sputum examinations should be repeated. Cases of pulmonary cystic disease frequently give a history of periods of productive cough with blood-streaked sputum and many of them have been hospitalized as tuberculous. Roentgenograms of the chest strongly resemble those of productive tuberculosis, but lipiodol instillation provides the basis for differential diagnosis. In another case a roentgenogram of the chest showed atelectasis of the right lower lobe and pleurisy with effusion. On aspiration of the chest, clear, straw-colored fluid was obtained. Sputum examinations, smears and cultures showed no acid-fast bacilli. Autopsy revealed a primary bronchogenic carcinoma and an inactive fibrous tuberculous lesion in the upper right lobe and calcified peribronchial lymph nodes. Active or inactive tuberculosis in a lung involved by bronchogenic carcinoma has been seen so that neither of these diseases excludes the other. When the primary cancer

ulcerates, it may produce an abscess which in the roentgenogram may strongly resemble an abscess due to pyogenic infection or a tuberculous excavation. In a case of metastatic cancer where repeated sputum examination showed no acid-fast bacilli, yeasts or fungi, a roentgenogram showed miliary-like infiltrations throughout both lungs and, when repeated three weeks later, a marked increase in the density of the infiltrations. Metastatic pulmonary cancer may be of small nodular type strongly resembling miliary tuberculosis, or pleural metastasis may give rise to a pleural effusion, masking the roentgenogram. Repeated sputum examinations in a coal miner showed no acid-fast bacilli, and the roentgenogram was interpreted as silicosis. He was under observation for five years and repeated roentgenograms showed no essential difference in appearance. Tuberculosis is frequently superimposed upon silicosis so that an accurate diagnosis is important, for the silicotic may not need hospitalization and the method of management of tuberculosis depends on whether or not silicosis is associated with it. The second degree of silicosis may have a striking roentgenographic resemblance to miliary tuberculosis, but a history of exposure to silica, the presence or absence of symptoms of miliary tuberculosis and serial films are of assistance in making the correct diagnosis. When tuberculosis is superimposed on a third degree silicosis, there may be little change in the roentgenograms and the clinical findings may not be greatly altered. Rapidly enlarging cavities indicate active tuberculosis but a definite diagnosis may depend on the finding of acid-fast bacilli in the sputum. A patient under observation for two years with a history of empyema followed by persistent cough and blood-streaked sputum, showed marked decrease in the increased lung markings present in the roentgenogram subsequent to improvement in her cardiac condition. Chronic valvular heart disease may produce pulmonary fibrosis which strongly resembles productive tuberculosis in the roentgenogram. The differential diagnosis may be made difficult by haemoptysis which is common in these cases. A diffuse fibrosis was found on autopsy in a case of pulmonary moniliasis. The roentgenographic shadows produced by actinomycosis, blastomycosis and moniliasis are those of diffuse fibrosis, often with small abscesses. They may suggest some unusual condition but are rarely diagnostic and may be indistinguishable from the bizarre distribution of fibrosis sometimes present in productive tuberculosis. Under antisyphilitic therapy, the roentgenograms taken at intervals of the chest of a very rare case of syphilis of the lung, showed progressive clearing of the infiltrations originally diagnosed as tuberculosis. Although a roentgenogram of the chest may be diagnostic, the cases discussed herein illustrate it is only one of the examinations which must be employed in making a diagnosis.—*Diagnostic Difficulties in Roentgen-Ray Examination of Pulmonary Tuberculosis, C. C. Birkelo & W. L. Brosius, Radiology, January, 1941, 36: 46.*—(*G. F. M.*)

Tuberculin Test and Roentgenogram in Early Tuberculosis.—A study of tuberculosis in nurses at the Boston City Hospital, carried on since 1932, has shown that the morbidity is almost equally distributed between those who enter training tuberculin-positive and those who enter tuberculin-negative. All but a few of the nurses who enter training with a negative tuberculin test become positive during their three years on the wards. In the majority of these the usual benign primary infection develops in a region not demonstrable roentgenographically. In a few nurses small but definite roentgen lesions develop without clinical manifestation of active disease, while others progress to clinically active tuberculosis. Having established the diagnosis of the early tuberculous lesion by its persistence in the roentgenogram, it must, if possible, be determined whether it is an old healed scar, a latent process potentially active in the future, an early destructive infiltration or a benign lesion which will heal spontaneously. It is the roentgenologist's responsibility to recognize these small tuberculous infiltrations. He must understand their latent potentialities, and in cooperation with the internist interpret correctly their characteristics.—*The Tuberculin Test and Roentgenogram in the Early Tuberculous Lesion, T. L. Badger & M. Ritvo, Am. J. Roentgenol., April, 1941, 45: 481.*—(*W. H. M.*)

Comparison of Roentgen-photographic Methods.—One thousand patients in a mental hospital were given triplicate roentgenological examinations, employing conventional 14 x 17 inch films, 4 x 5 inch fluorographs and 35 mm. fluorographs. All methods detected advanced lesions. Minimal lesions demonstrable in the large film were missed in 3.4 per cent of cases with the 4 x 5 inch films and in 17.4 per cent of cases with the 35 mm. fluorographs. Moreover, the number of retake 14 x 17 inch films requested in order to establish a definite diagnosis was so much larger with 35 mm. films than with 4 x 5 inch films that the total cost per patient was less with the latter method. The authors conclude that use of the 4 x 5 inch film is the method of choice for survey purposes.—*Comparative Value of Roentgen-photographic Methods, R. E. Plunkett, G. W. Weber & J. Katz, Am. J. Pub. Health, August, 1941, 31: 772.*—(*H. L. I.*)

Diagnostic Importance of Sensitivity to Tuberculin.—The author believes that the determination of sensitivity to intracutaneous tuberculin is of significance in the differential diagnosis of tuberculosis. He believes that a positive reaction to high dilutions of tuberculin means an active tuberculous process. When he is suspicious of a highly allergic disease, such as pleural effusion, he uses dilutions starting at 0.1 cc. of 1:10,000,000,000. When dealing with an apparently inactive tuberculous process, he begins skin tests with much lower dilutions.—*Die Technik der intrakutanen Tuberkulinreaktion bzw. die Bestimmung der Tuberkulinreizschwelle, F. Ickert, München. med. Wchnschr., February 21, 1941, 88: 219.*—(*H. M.*)

Blood Picture in Tuberculosis.—This is a study of the blood picture in 200 cases of pulmonary tuberculosis in Korea, where immunity to the disease is low. The Arneth and Schilling counts were used to form a working ratio M + N/L with the monocytes, neutrophiles, and lymphocytes as the components. Tuberculin, X-ray films, physical signs and sedimentation rates were used in conjunction with the blood picture to determine the activity of the tuberculous disease and a control group of 30 healthy nurses was also studied. In this latter group it was found that the second readings, using the formula, dropped below 2 in twenty-four hours. The Old Tuberculin was given intracutaneously in doses of 0.05 cc. of a 1:1000 solution to stimulate the leucocytic shift. Blood counts done every four hours showed the greatest leucocytic reaction in twenty-four hours after the tuberculin injection. A group of 170 doubtful, minimal and advanced cases were thus tested with results showing various degrees of activity. Most of the negative skin tests were in cases with a "low resistance" blood picture of about 1.6 and an active rise. Arrested cases and those with a history of pleurisy with effusion without parenchymatous involvement had readings below 2.2 and an inactive drop. Active cases showed a low initial reading with a sharp rise proportional to the activity demonstrated by X-ray. The test was used with success in pneumothorax cases and its use is suggested in pregnancy, differential diagnosis and prognosis. The authors believe that of the total 200 cases studied all showed results of their test agreeing with the findings by X-ray, sedimentation rate and physical examination.—*A Test for Activity in Pulmonary Tuberculosis, S. H. Martin & P. S. Yu, Canad. M. A. J., April, 1941, 44: 399.*—(*W. G. C. M.*)

Woldman Test in Tuberculosis of Intestines.—The phenolphthalein test, as described by Woldman, was carried out in 230 cases of pulmonary tuberculosis. A gastrointestinal series was carried out in all these patients. The basis for the diagnosis of intestinal tuberculosis was a persistent spasm of the ileocaecal region. A diagnosis of intestinal tuberculosis was made by X-ray in 110 of the 230 cases. Of these 110 patients, 90 or 81.8 per cent had a positive Woldman test. Of the 120 cases in whom no X-ray evidence of intestinal disease was found, 40 or 33.3 per cent had a positive test. The percentage of error in both groups was 26 per cent. The test was also used on 19 cases in which the patient came to post-mortem examination. The interval between the test and date of death was from two weeks to two months. The test coincided with the post-mortem findings in 14 cases (74 per cent). The test is of limited value in proving the presence

of intestinal tuberculosis.—*The Woldman Phenolphthalein Test in Intestinal Tuberculosis, A. L. Kruger & H. J. Perlberg, Am. J. Digest. Dis., June, 1941, 8: 209.*—(*H. R. N.*)

Miliary Calcifications.—Granting that tuberculosis is not the cause of all miliary calcifications in the lung, the fact remains that it is the cause of at least a large majority. The clinical conception that miliary tuberculosis is a disease necessarily fatal, and rapidly so, has become unsustainable in view of the roentgenological explorations of the chest revealing lungs showing miliary seeding in patients who have outlived the expected early death from miliary tuberculosis, and others who, in apparently perfect health, show shot-like calcifications within the lungs not unlike tuberculosis of the miliary type. It is possible by careful study of the roentgenograms, to make a differential diagnosis between healed acute miliary tuberculosis and healed disseminated tuberculous bronchopneumonia. In healed miliary tuberculosis the history is negative, the chest films show numerous scattered calcified nodules of symmetrical bilateral distribution and striking uniformity in size and of equal density, the lung parenchyma being otherwise clear. In healed miliary disseminated tuberculous bronchopneumonia, there may be a clearly unmistakable history of previous tuberculosis or one quite suggestive of the condition. The nodules are irregular in distribution, shape and size and are found in all stages of calcification. Scrutiny of the roentgenogram will reveal old signs of healed tuberculosis usually in the upper lobes or retraction of one or both of the apices.—*Multiple Miliary Calcification of the Lung, A. Mayoral, Radiology, March, 1941, 36: 367.*—(*G. F. M.*)

Silica in the Treatment of Tuberculosis.—In an effort to prove or disprove the efficacy of silica in the treatment of pulmonary tuberculosis, 24 patients were treated with a lipoid soluble preparation of silicic acid. The period of treatment was preceded by a suitable control period. Two control groups were treated symptomatically over a comparable period of time. Neither the general condition of the silica treated patients nor individual laboratory determinations showed any improvement, and the authors conclude that no beneficial results beyond those seen in the control groups are noted after silica.—*Erfahrungen mit einem lipoidlöslichen Siliciumester in der medikamentösen Behandlung der Lungentuberkulose, G. Bauer, München. med. Wchnschr., January 17, 1941, 88: 74.*—(*H. M.*)

Collapse Therapy.—Because of the high tuberculosis incidence among the population in Puerto Rico an extensive program for the application of collapse therapy was started in 1935. In nineteen clinics, pneumothorax treatment is now being applied to ambulatory cases. The tuberculosis mortality has come down from 337 deaths per 100,000 in 1933 to 258 in 1939; 5,562 patients have been treated with pneumothorax, 2,231 patients received no pneumothorax. Sputa turned negative in 2,151 patients (44 per cent) of 4,888 patients with positive sputum treated with pneumothorax. The chance of becoming sputum negative was four times as great in patients treated for over one year as compared with those treated less than three months. The sputum conversion depended more on the duration of the pneumothorax treatment than on the stage of the disease. Of 3,710 cases with cavities, in 1,487 cavity closure was achieved by pneumothorax. Within two years after diagnosis 26 per cent of the untreated cases died against 9 per cent of the treated cases; 126 accidents, of which 15 were fatal, occurred in 296,915 insufflations. The value of the ambulatory pneumothorax treatment as a public health measure is stressed and its low costs compared with the costs of hospitalization are pointed out.—*Collapse Therapy as a Public Health Measure in Tuberculosis, E. Garrido Morales & J. Rodriguez Pastor, Bol. Asoc. méd. de Puerto Rico, April, 1941, 33: 129.*—(*G. C. L.*)

Indications for Pulmonary Surgery.—The author states that 53.2 per cent of patients in residence over one year in Muskoka Hospital have had one or more surgical operations of one type or another for pulmonary tuberculosis. He reviews reports of other authors and compares the results of treatment of tuberculosis cavities by rest therapy alone with those ob-

tained by collapse therapy. Barnes and Barnes reported that 79 per cent of 616 patients with cavities seen by X-ray were dead in three years after diagnosis when rest therapy alone was used. These are compared with 144 patients with cavities apparent, 75 per cent of whom were working two years following thoracoplasty, as reported by Janes. Another series of 85 patients who accepted thoracoplasty when recommended, showed a result of 57 with closed cavities and only 14 dead three years after operation, as compared to 58 patients refusing operation, 10 of whom had closed cavities, 35 were worse and 26 dead. These cases were reported by Freedlander and Wolpaw. A third series consisted of 139 patients with minimal tuberculosis as reviewed by Turner and Collins, 40 of whom received pneumothorax and all were well as compared with 75 controls taking rest treatment alone, of whom only 50.6 per cent were well. The author then discusses the various types of operation used in obtaining collapse of diseased areas of the lung and suggests the form of operation best suited to the various types of case.—*Indications for Surgery in Pulmonary Tuberculosis, R. Robertson, Canad. M. A. J., February, 1941, 44: 107.*—(*W. G. C. M.*)

Collapse Therapy in Children.—The prognosis of open tuberculosis in children is very poor. Approximately 80 per cent of open cases are dead within 10 years. Collapse therapy is applied according to the same principles as in adult tuberculosis, namely in cases with cavity formation. A positive sputum without demonstrable parenchymal lesion is not considered sufficient indication for collapse therapy, since positive sputum in children frequently arises from ulceration of tracheobronchial lymph nodes. The greater proportion of children actively treated falls between the ages of twelve and eighteen. However, various forms of collapse therapy are applicable in the treatment of much younger children, and the author has successfully treated a three year old child by pneumothorax therapy. Exudative pneumonic processes and spreading primary complexes without cavitation are not treated by collapse therapy. Of 146 children admitted to the institution within one year, 70 per cent were treated with pneumothorax. Of these, 50 per cent were treated with some measure of success, and sputum has been negative for three months. The collapse methods employed are the same as in adults, namely pneumothorax is used whenever possible, supplemented by pneumonolysis. Phrenic operations as adjunct or independent therapy, extrapleural pneumothorax and plombage, oleothorax and thoracoplasty were occasionally used with success. Monaldi suction drainage has been employed within the last years with some success. When good indications were present, thoracoplasty was as successful in children as it is in adults.—*Über die aktive Behandlung der offenen Lungentuberkulose bei Kindern und Jugendlichen, H. Brügger, München. med. Wchnschr., April 18, 1941, 88: 466.*—(*H. M.*)

Pneumothorax in Middle Age.—The author reports on 107 cases of pneumothorax performed on Puerto Rican World War Veterans, all over forty years of age; the mean age was forty-six years with the greatest number of cases falling within the forty-two to forty-eight year period. The course of the illness was generally slow and progress was slight. The disease was well tolerated and many patients in whom the pneumothorax was discontinued as unsatisfactory have subsisted for many years. The majority of the cases were of the chronic type, with cavities associated with a great deal of perifoccal fibrosis. The author emphatically denies the contention of many American authorities that tuberculosis among Puerto Ricans is of the rapidly fatal, malignant type. He strongly criticizes the practice of many sanatoria in New York City of classifying Puerto Ricans under a separate racial heading. Puerto Rican authorities and their statistics are quoted to demonstrate the similarity of tuberculous lesions in that country to those seen elsewhere. Unfavorable statistics among Puerto Ricans residing in U. S., reported by North American clinics, are due to the miserable living conditions of the anaemic, tropic-bred people in the overcrowded slums of the United States. Only 10 out of 107 cases resulted in a complete anatomical collapse. The lung duration of the disease and the great deal of fibrosis accounted for the adhesions present

in the remaining cases. Complete pleural symphysis making pneumothorax impossible was encountered in 10 patients. The author stresses the importance of a complete collapse for sputum conversions. In the earlier cases of the series (cases started from 1935 to 1939) and those with anatomical collapse, sputum conversion occurred in 80 per cent; 10 per cent persisted positive and 10 per cent died. With nonanatomical collapse the corresponding figures were 52 per cent, 13 per cent and 35 per cent; while in the group with impossible pneumothorax the respective figures were 10 per cent, 40 per cent and 60 per cent. Even though complications are more frequent if an unsatisfactory pneumothorax is continued for over six months, the conversion of sputa that occurs after that time fully outweighs the complications that arise because of the prolongation of the pneumothorax. This is true as long as the case is chronic; should there be the slightest evidence of acuteness the dictum of discontinuation of pneumothorax and performance of thoracoplasty is advocated. Complications were highest in the group with incomplete pneumothorax. For the whole series these complications were: empyema (16 per cent); contralateral spread (23 per cent); serous effusions (30 per cent); spontaneous pneumothorax (2 per cent). There were 26 deaths of which 17 were due to progressing tuberculosis, 2 to a haemoptysis, 2 to empyema, one to spontaneous pneumothorax, one to tuberculous peritonitis and 3 to unrelated miscellaneous accidents.—*El neumotorax en los tuberculosos de edad media, J. F. Pou-Valldejuli, Bol. Asoc. méd. de Puerto Rico, April, 1941, **33:** 144.*—(*J. F. P-V.*)

Pneumothorax in Elderly Diabetics.—Forty-six patients over forty years of age who had both diabetes and pulmonary tuberculosis were treated by pneumothorax. Most of these individuals had rather acute caseous pneumonic tuberculosis with cavitation. Of the 46 patients 21 (46 per cent) had conversion of sputum from positive to negative effected by the pneumothorax. Serous effusions occurred in 33, empyema was found in 11 cases (24 per cent) and bronchopleural fistula in 4 (8 per cent). Twenty of the group (43 per cent) died of progression of the disease or of complications of the pneumothorax. Of the 26 living patients, 16 now have negative sputum. It is apparent that tuberculosis in elderly diabetic patients is a rapidly progressive disease and that the complications of artificial pneumothorax are numerous. However, it is the only form of treatment that offers reasonable chance of cure to such patients.—*Pneumothorax in the Diabetic Past the Age of Forty, H. H. Epstein & S. Trubowitz, Quart. Bull Sea View Hosp., April, 1941, **6:** 309.*—(*A. A. E.*)

Contralateral Pneumothorax.—A contralateral pneumothorax should be induced when the induction of a pneumothorax on the diseased side is made impossible by adhesions and a more active collapse therapy is contraindicated. Good results are achieved in not too far extended fresh infiltrative, cavitary and fibrocavitary lesions if they are situated in the subclavicular and midzone of the lung. The mediastinum should not be rigid. Haemoptysis seems to be a special indication for contralateral pneumothorax. If no improvement can be seen after three months the pneumothorax should be abandoned. Four cases are reported in which the diseased lung showed improvement after the establishment of a contralateral pneumothorax.—*Le pneumothorax contro-latéral, J. Lundquist, Acta tuberc. Scandinav., 1941, **15:** 131.*—(*G. C. L.*)

Thoracoplasty.—Between 1933 and 1939 thoracoplasties were performed at the Colindale Hospital on 54 male patients with fibrocaseous and cavernous pulmonary tuberculosis affecting an average of over two lobes each. An average of 2 stages in the earlier cases and 2.4 stages in the later cases was performed. Since 1936 the Semb modification was practised in 23 (42.6 per cent) of the group without any change for the better in the results of partial thoracoplasty. Almost all patients were subjected to other forms of active therapy before undergoing thoracoplasty, usually artificial pneumothorax. Each patient was followed for at least a year after the last stage and statistical review indicated that 10 (18 per cent) were dead, 2 (4 per cent) were going downhill, 7 (13 per cent) still had active disease and 35 (65 per cent)

were quiescent with negative sputa. Of the 10 deaths, 6 occurred in the immediate postoperative period. In the quiescent group, 25 are now at work in industry. Moderate or advanced scoliosis was a common sequelae. Symptomless bronchiectasis was discovered in 13 of 27 cases examined by bronchography after operation. A control series of 44 nonoperative tuberculous patients of comparable age group and extensiveness of disease showed 20 (45.5 per cent) dead, 11 (25 per cent) going downhill, 6 (13.5 per cent) with active disease and 7 (16 per cent) quiescent.—*Thoracoplasty for Pulmonary Tuberculosis, J. V. Hurford, Lancet, May 31, 1941, 1: 693.*—(*J. B.*)

Bilateral Thoracoplasty.—A case of bilateral upper stage thoracoplasty is reported. The patient was a young woman who had been ill with tuberculosis for several years. On admission she presented bilateral cavities located beneath the clavicles. She had been on conservative therapy for some time without improvement. She had productive cough, fever and positive sputum. Pneumothorax was impossible and a temporary right phrenic crush was performed without benefit. After an observation period of two years, during which time her lesions appeared stationary, she was subjected to two stages of thoracoplasty on the right followed by one stage thoracoplasty on the left. Two stages had originally been contemplated for the left side, but the sputum turned negative after the first stage and remained so. The patient remained well during the following ten months of observation.—*Un cas de thoracoplastie bilatérale, J. Roger & J. Lemieux, Laval méd., October, 1941, 6: 379.*—(*H. M.*)

Extrapleural Pneumothorax.—A review of results in 44 patients (48 operations) is submitted. The ages of the patients ranged from seventeen to forty-five years. The operation was performed on the right side in 20 cases and on the left side in 28. The shortest period of observation since the operation was one year, and the longest, three and three-quarter years. The mean period of observation was twenty-eight months. The authors conclude that extrapleural pneumothorax, even with good technical results, is sometimes disappointing as the cavity may be pushed towards the mediastinum above the lung root, but may remain open, though compressed in a slit-like shape. The technical skill and judgment in operating are of great significance in the final result. If the space is too small, obliteration may take place, and if the space is too large there is considerable risk of haemorrhage and infection. The operation should often be combined with other operative measures. It has considerable value in controlling a lesion sufficiently long to render thoracoplasty possible at a later stage. A conversion to oleothorax is a valuable reserve. With due consideration for the type of patient and disease treated, the operation is of real value and deserves to remain a part of the therapeutic attack against pulmonary tuberculosis.—*Extrapleural Pneumothorax, A Review of Results, F. A. H. Simmonds & A. G. Hounslow, Tubercle, March, 1941, 22: 66.*—(*E. H. R.*)

Intracavitary Drainage.—Six cases, all in good general condition, with relatively stationary cavities were treated by intracavitary aspiration, 2 with continuous and 4 with intermittent suction. In 2, closure was obtained. In one, it has lasted more than one year. In the second, the cavity reappeared shortly after treatment was stopped. In 2 cases, the process was aggravated, one by fatal reactivation of a contralateral lesion and the other by infection and cavitation of the lower part of the same lung. In one case a phlegmon of the chest wall and aggravation of the tuberculosis occurred. In the sixth case, a fatal pneumothorax occurred as a complication of the operation. The only lasting cure was obtained where Monaldi's method was followed least accurately. The procedure is attended by considerable risk. One must not overlook the danger involved in traumatizing the tuberculous tissue of which the wall of the cavity is composed. If one were to use any more strict criteria for the application of the procedure than were used in these cases, there would be scarcely any suitable cases. The indications are far from clear and the procedure is too risky to be applied empirically. It is not proposed to continue its use.—*Punción y aspiración de las cavernas tuberculosas, A. A. Raimondi, M.*

M. Brea & J. A. Taiana, Arch. argent. de tisiol., October–December, 1940, 16: 330.—(H. B. S.)

Intracavitary Drainage.—In view of the great interest in this procedure, which is evidenced even in the political press, deductions from a study of 8 cases treated by aspiration are presented. The period of observation runs from six weeks to sixteen months. Criteria for the selection of cases were the probability that no other form of therapy would benefit the patient and that the aspiration could be undertaken without immediate risk to the patient. Five cases were failures. In one case, the patient could not tolerate the catheter. In 2 cases, reduction of the size of the cavity was followed by progression of lesions already present in the area about the cavity, with the development of one or more new cavities. In both cases, the thoracoscopic examination of the cavity showed evidence of active tuberculosis of the wall. This was confirmed in one case which died and came to autopsy. In addition, the histological study demonstrated that, contrary to Monaldi's contention, the blood supply of the walls of the newer, undrained cavities was just as good as that of the cavity subjected to aspiration. In the remaining 2 failures, there was no change for the worse. One was a large apical cavity in which closure was hampered by the lack of distensible tissue around it. In the second, the absence of a positive pressure within the cavity was considered responsible for the lack of results. Three cases showed some degree of success, one apparently to the point of cure. In one a large upper lobe cavity was reduced markedly in size. Complete closure was prevented by the lack of distensible tissue in the surrounding area and the caseous character of the wall. In the second, a right upper lobe cavity was closed by thoracoplasty and marked diminution in size of a left upper lobe cavity followed the aspiration. The cured case showed a smooth-walled cavity surrounded by distensible parenchyma, with retention of secretions and a positive pressure. At present, indications favoring transparietal aspiration are (*1*) adherent pleura at the point where the catheter is to be introduced, (*2*) absence of lesions in the tissue around the cavity, (*3*) stationary cavity, (*4*) predominantly positive pressure within the cavity, (*5*) favorable general physical condition of the patient and local physical condition of the cavity. This last means a clean granulating internal surface. A tabulation of 261 reported cases indicates 30.6 per cent of failures, 1.1 per cent mortality from the procedure, 49.4 per cent under observation, 1.1 per cent cured by subsequent thoracoplasty, and 17.6 per cent cured. Monaldi reports 19.2 per cent cured, all other authors an average of 12.5 per cent.—*Aspiración transparietal de las cavernas tuberculosas del pulmón, Nuevas comprobaciones, An. de la catedra de patol. y clin. de la tuberc., December, 1940, No. 2: 349.—(H. B. S.)*

Intracavitary Drainage.—The author believes that the two most important factors in the spontaneous closure of cavities are the closure of the draining bronchus and the reaeration of pericavitary atelectatic areas. Closure of the draining bronchus is brought about by a specific tuberculous bronchitis which destroys the bronchial wall including the cartilage. The stiff wall collapses and the lumen of the bronchus is filled with specific tuberculous granulation tissue. This is later replaced by dense fibrous tissue. Due to closure of the bronchus, the necrotic tuberculous lining of the cavity is separated from the cavity wall proper, and the tubercle bacilli die out. Small residual cavities may persist for many years, because granulation tissue is slowly formed around the cavity. The fact that alveoli in the neighborhood of cavities often show cuboidal epithelium is taken as evidence of their previous atelectatic state. This reaction is seen only if marked septal inflammation is absent. The author has performed autopsies on 9 cases treated with Monaldi drainage for from one to thirteen weeks. Death in all but two cases was entirely unrelated to the intracavitary drainage. The author states that all factors which are present in the spontaneous healing of tuberculous cavities are furthered by Monaldi drainage. The emptying of the cavity of its caseous bacilliferous contents promotes separation of the necrotic wall and the formation of a clean cavity wall. Even when the stiff wall of the cavity prevented collapse, cleaning of the cavity wall was observed. This may be the

only effect in large cavities which involve the entire lobe. These cavities do not have a wall of surrounding atelectatic lung tissue but reach the greatly thickened pleura. When collapse of cavities is observed, local pericavitary emphysema and reaeration of pericavitary atelectatic areas principally contribute to the shrinkage of the cavity. The treatment also promotes a specific tuberculous bronchitis of the draining bronchus with its ultimate closure. Where a partial obstruction of the draining bronchus with the production of a valve mechanism exists, puncture of the cavity abolishes the existing positive pressure and thus promotes collapse. The author has also studied the puncture canal histologically and in all cases observed a specific and a nonspecific inflammation. This is of no practical consequence. He concludes that from histological examinations Monaldi drainage is a physiologically sound procedure which promotes healing of cavities.—*Die Saugdrainagebehandlung tuberkulöser Lungenkavernen (Monaldi) in morphologischer Beurteilung, W. Berblinger, Beitr. z. Klin. d. Tuberk., 1940, 95: 228.*—(*H. M.*)

Intracavitary Drainage.—Effects of intracavitary aspiration: The space occupied by a cavity does not represent an equivalent amount of destroyed tissue. The size of a cavity is determined by the amount of traction of extracavitary tissue and the intracavitary pressure. Partial obstruction of the draining bronchus often produces positive pressure within the cavity. According to Monaldi, there exist three types of cavities, depending on their response to treatment. The retractile type of cavity occasionally heals spontaneously. It is influenced by simple relaxation of the lung. The inert type of cavity does not close spontaneously because of the loss of power of elastic retraction. Suction drainage is particularly suited for this type of cavity. At the other extreme, is the undeformable type of cavity with rigid walls which does not respond to treatment. Continuous aspiration releases the cavity from the orces tending to keep it open. Cavities will fradually become smaller and close due to reëxpansion of previously atelectatic lung tissue surrounding the cavity, compensatory emphysema and fibrosis and retraction. Marked changes are produced in the wall of the cavity due to the elimination of the caseous contents; healthy granulation tissue appears. The draining bronchus, if previously open, becomes closed due to obliterative bronchitis, an essential factor in permanent results. Improvement is reflected in the amount and nature of the cavity secretion which becomes thinner, more serous, reduced in amount and the tubercle bacilli are gradually eliminated. There is marked improvement in the patient's general condition and even extrapulmonary tuberculous involvements are favorably affected. Indications: Isolated cavities with little or no tuberculous invasion of surrounding tissue are ideal for the treatment. An obliterated pleural space, at least in the region of the cavity, is essential. There must be sufficient pulmonary tissue surrounding the cavity to respond to suction. The contraindications are: a free pleural space, acute disease, previous pneumonolysis and haemoptysis. The technique is described in great detail. The termination of treatment is determined by the radiological absence of cavitation, the absence of tubercle bacilli from the sputum and secretions from the cavity and the closure of bronchial communication to the cavity. Complications: Embolism and haemorrhage constitute the most serious complications. Exacerbation of disease near the cavity is rarely encountered. Pyopneumothorax occasionally occurs in instances with unrecognized pleural space. Other complications such as infection of the catheter tract and of the parietes are rarely encountered. Results: From August 8, 1938 to November 20, 1939, 198 cases treated at the Forlanini Institute are analyzed in the report. In 79 cases the cavity disappeared. About half of this group still had catheters in the chest "as a measure of prudence." In 55 cases there was improvement. In 64 cases the procedure was either a failure or had to be abandoned.—*The Treatment of Tuberculous Lung Cavities by Closed Suction Drainage—Monaldi's Method, H. Roche, Tubercle, January, 1941, 22: 1.*—(*E. H. R.*)

Intracavitary Drainage.—To date, the author has treated over 400 patients with intracavitary drainage. He summarizes his experiences as to indications and results. The aim

is to clean the cavity of its pathological contents and to produce obliteration of the space. The wall of the cavity is quickly cleaned in practically every case and the general health of the patient improves. Systemic symptoms disappear rapidly, the patients gain weight, strength, appetite improves, etc. Of the greatest importance for the ultimate closure of cavities is the closure of the draining bronchus. If this occurs early, good results may be expected. Occasionally delayed obliteration of the bronchus has been seen when suction drainage has been continued for a long time. No permanent cure is to be expected if the bronchus fails to close, but improvement of the general condition is seen in all cases. The cavity disappears completely only if it is surrounded by a certain amount of normal lung tissue. The steps leading to obliteration of the cavity are increased vascularity of the surrounding tissue, formation of new fibrous tissue and eventual cicatrization. Other factors in closure are reaeration of pericavitary atelectatic areas and the development of pericavitary emphysema. Best results are seen in isolated cavities with or without disseminated disease in the rest of the lung. It is frequently observed that successful treatment of the cavity is accompanied by disappearance of such disseminated foci. Multiple cavities have also been treated with success. Rapidly progressive cavitation in exudative areas should not be tackled by intracavitary drainage. A long period of follow-up with the aid of tomograms is necessary. It is advised that the sinus tract be kept open by probing for some time after the discontinuation of treatment, so that suction drainage may be instituted again if there is evidence of recurrence of cavity. While the exact place of Monaldi drainage in the therapy of tuberculosis is as yet undetermined, there is no doubt that it is a valuable adjunct to the present forms of treatment.—*Über die Saugdrainage der tuberkulösen Lungen-Kavernen, V. Monaldi, München. med. Wchnschr., April 18, 1941, 88: 453.*—(*H. M.*)

Intracavitary Drainage.—The technique, indications, and results of the Monaldi intracavitary drainage are reviewed. The best indication is a large isolated cavity, the walls of which should not be completely rigid. The procedure is more easily carried out if the cavity is not in the extreme apex. The draining bronchus should show some degree of stenosis. If the cavities are located posteriorly, drainage may be done through the posterior chest wall. The method is advantageously applied to cavities persisting after thoracoplasty. It may also be used prior to thoracoplasty or other surgical procedure, if the cavities are very large. Dangers arising from the procedure are few. It is essential that no localized pneumothorax space exists over the cavity. Age and debility are no contraindications *per se*, as the procedure is well tolerated. To date results have been encouraging.—*Die Behandlung tuberkulöser Kavernen mit dem Saugdrainageverfahren, A. Sartorius, München. med. Wchnschr., April 18, 1941, 88: 459.*—(*H. M.*)

Intracavitary Drainage.—In a 54 year old patient with a tuberculous cavity in the right lung intracavitary drainage (Monaldi) was performed. The tube was inserted posteriorly in the third intercostal space medial to the scapula. The patient died two months later from recurrent endocarditis and cardiac insufficiency. The interesting findings at autopsy were: A channel reached the cavity from the posterior aspect. A channel led from the anterior wall of the cavity to the anterior chest wall; the catheter had perforated the cavity and the lung tissue in front of it. The wall of the channel consisted of scar tissue, which was approximately 1 mm. thick, separating the catheter from the lung tissue.—*Eigenartige Komplikationen bei der Kavernensaugdrainage, A. Lemberger, Ztschr. f. Tuberk., February, 1941, 86: 30.*—(*G. C. L.*)

Intracavitary Drainage.—When instituting the tube for intracavitary drainage (Monaldi) it is very difficult and often even impossible to hit the centre of the cavity. The following modification of the technique is therefore recommended. A stainless rigid steel wire, 1 mm. in diameter, is placed through the thin hollow needle with which the cavity is pierced. The wire remains in the desired measurable depth under X-ray control when the needle is withdrawn. Then the trocar is pushed over the

wire into the chest to the same depth.—*Zur Technik der Kavernendrainage nach Monaldi, E. Dorn, Ztschr. f. Tuberk., February, 1941, 86: 27.*—(*G. C. L.*)

Intracavitary Drainage.—The author, who has used this procedure in 9 cases since 1939, discusses Monaldi's aspiration treatment of tuberculous cavities. The operation, a rather simple one according to the author, produces remarkable results such as rapid detoxication of the patient and often complete closure of even large cavities. Thus it is a very important preliminary to a later thorocoplasty in patients too ill to be considered for such surgery at first. The theory behind the procedure is briefly described as producing a constant negative pressure within the cavity, reducing the tendency of the cavity walls to expand with inspiration, and also eliminating harmful secretions which ordinarily would be excreted through the bronchi and upper respiratory passages. If the draining bronchus be somewhat stenosed, the tendency of intracavitary gas under a positive pressure to continue the patency of the antrum may be reduced by Monaldi's method of aspiration. The author has also used the treatment in purulent pleurisy with success, advocates this technique in selected cases, and also foresees its use in the future as a possible means of exploring cavity walls and cauterizing the draining bronchus through some form of optical apparatus.—*Drainage of Tuberculous Cavities by Aspiration (Monaldi Method), A. Joannette, Canad. M. A. J., January, 1941, 44: 46.*—(*W. G. C. M.*)

Boeck's Sarcoid.—Schaumann, in 1914, first recognized this disease as a systemic disease. The aetiology is obscure. Many consider it a form of tuberculosis because tubercle bacilli have sometimes been isolated from the lesions and because some cases develop definite tuberculous lesions. Against this theory is the failure to demonstrate tubercle bacilli in the majority of instances and failure of most cases to give positive tuberculin skin reactions. The proponents of the theory claim an atypical or non-acid-fast phase of the bacillus to explain this. Schaumann and others have cultivated a group of pleomorphic organisms from the lesions, which are believed to represent such a phase; they have been observed to become acid-fast on passage. The lesions, as in lupus vulgaris, usually regress when definite tuberculosis supervenes. Neoplastic, syphilitic, mycotic aetiologies have been discarded. The Frei test is occasionally positive but no connection with Nicholas-Favre's disease has been shown. And as yet unidentified virus is suggested by some. Others favor an acid-fast bacillus related to the bacilli of Koch and Hansen, but not identical. The localization of the skin lesions over the upper face suggests a connection with leprosy. The typical and invariable lesion is a nodule exclusively of epithelioid cells. It is rare to find necrosis, peripheral lymphocytic reaction or giant cells. These last, when present, are of the foreign body type. Where the lesions regress, there is a tendency to fibrosis and hyalinization. The disease occurs almost exclusively in young adults. It is most frequent in Northern Europe. In North America, it is more frequent in Negroes than in whites. There is no organ which has not been described as affected, but the skin, lymph nodes, and lungs are the most frequently involved. The onset is usually insidious, often with general symptoms of ill health and low-grade fever and weight loss. There are four types of skin lesion: (*1*) an eruption of small nodules, red at first, later passing through a livid stage to a brown color, wide-spread, but tending to localize about the nostrils and eyelids (cf. leprosy), and usually sparing the palms, soles and hairy areas; (*2*) the commonest type, larger, pea to nut-sized nodules of similar character, which on resolution have atrophic scars with pigmented borders; this type embraces the angiolupoid, consisting of four or five nodules, located generally about the nose, 2 to 2.5 cm. in diameter, covered by atrophic skin and exhibiting telangiectases; (*3*) lupus pernio, located on the face, especially about the nose, also on the ears and fingers, consisting of diffuse, deep, soft, reddish-blue infiltrations with yellow areas, covered by inflamed skin with dilated pores and superficial erosions; (*4*) an erythrodermia. The nails are often striated and brittle and the nail-bed may exhibit lesions. Oral and nasal mucosae may be

involved, especially the latter. Lymph nodes, most usually the axillary, epitrochlear and mediastinal, are involved in 50 per cent of the cases. Nodes reach a size of 4 to 6 cm., are firm, movable, non-tender. The tonsils are frequently involved. Pulmonary lesions usually produce cough, fever and expectoration, simulating tuberculosis but may be asymptomatic. Haemoptysis has been reported. Three types of lesions occur; (*1*) symmetrical peribronchial fibrosis, most marked in the lower lobes; (*2*) diffuse parenchymal infiltration, radiating from the hilar areas and sparing the apices; (*3*) granular appearances. Pleural nodules, which are said to cause effusions, are described. The lesions are characterized by extreme chronicity but may resolve completely. Pathological examination reveals disseminated nodules of typical histology, which, especially in the granular form, feel like grains of sand. Bone lesions occur in 20 per cent of the cases, almost exclusively in the phalanges, metacarpals and metatarsals. There may be large cysts confined to the superficial layer of the cortex, and smaller cysts involving the whole bone and a reticular type with thickened bony trabeculae contrasting with rarefaction in the rest of the bone. Absence of periosteal or perifocal reaction and fistulae distinguishes this from other osteopathies; it resembles most that of leprosy. The lesions are chronic, progress irregularly and may resolve. They never perforate but cause inflammation and tenderness of the overlying tissues. Localization in the liver, spleen, kidneys, often presenting the picture of subacute glomerulonephritis with azotaemia, heart, with minor electrocardiographic abnormalities, stomach and intestines has been reported. Mammary, salivary and lachrymal glands may be involved, sometimes in the form of Mikulicz syndrome. Epididymitis simulating tuberculosis has been noted. Conjunctivitis, keratitis, iritis or more extensive uveitis occur. Recently the uveoparotid syndrome, sometimes with facial paralysis, has attracted attention. Muscle and peripheral nerve involvement occurs. No study of central nervous system involvement has been made. Positive skin tests with extracts of cutaneous sarcoids are obtained, but lymph node extracts give negative results. In tuberculous subjects, the cutaneous extracts frequently give positive skin tests. Increased erythrocyte sedimentation rates, inversion of albumin-globulin ratios, and increased phosphatase are seen in the blood of patients with sarcoid. Calcium may be elevated. A protein related to Bence-Jones protein has been found in the urine of some cases. Monocytosis is usual. The course is characterized by chronicity and periods of remission. Complete cure may occur. The two shortest reported recovery periods are five and twenty-seven months. Recovery may be spontaneous or subsequent to development of intercurrent tuberculosis. The disease is not fatal. Treatment is unsatisfactory. The skin lesions often respond to carbon dioxide snow or X-ray.—*Enfermedad de Besnier-Boeck-Schaumann: su estado actual, M. Celaya, Rev. argent. de tuberc., July-September, 1940, 6: 118.*—(*H. B. S.*)

Sarcoid in Chest Roentgenogram.—From 112 cases of established sarcoid disease encountered since 1921, 50 cases were selected as showing characteristic shadows in chest roentgenograms. In 24, diagnosis was proved by biopsy of the skin or a lymph node; in 11 there were sarcoid lesions of the eyes, skin, glands or bones, but no biopsy, and in the other 15 only the chest roentgenogram constituted the evidence. Roentgenograms are considered characteristic when the process is confined entirely or mainly to hilar nodes, when it involves only the pulmonary fields giving an appearance simulating miliary tuberculosis, or when it involves the nodes and apparently radiates from them into the pulmonary fields. The chest roentgenogram is not a measure of the gravity of the disease. Extensive pulmonary changes may clear without any respiratory symptoms and be accompanied by only slight evidence of a disseminated process; or there may be slight pulmonary involvement demonstrable roentgenographically, but lesions in other organs may cause prolonged and serious disability. Pulmonary lesions are only one feature of sarcoidosis. A satisfactory follow-up was made of 37 cases. In 23 the lesions in the chest have cleared completely, or almost completely, in from seven weeks to three years, the average time being twenty-two

months. In 3, the process is clearing but has not disappeared entirely after from one to three years. In 8 there is no change after from three months to four years. In 3 the process is spreading after seven months, eight months and four years, respectively. In the last of these, after apparent clearing there was a relapse with marked roentgen involvement of the lungs but without a corresponding increase in symptoms. This is the writer's only case of relapse after apparent clearing. The process may again clear, but it is possible that it is now active pulmonary tuberculosis. He has not observed any case in which active sarcoid lesions have appeared to undergo fibrosis; furthermore he has observed only 2 cases of possible pulmonary fibrosis in which sarcoid has been considered as aetiological factors. The findings in the chest in cases of erythema nodosum may simulate sarcoid disease.—*Sarcoid Disease as Revealed in the Chest Roentgenogram, D. S. King, Am. J. Roentgenol., April, 1941, 45: 505.*—(*W. H. M.*)

Chest Roentgenograms in Polycythaemia.—Polycythaemia vera and polycythaemia due to pulmonary arteriolosclerosis have many common clinical and laboratory findings. Roentgenograms of the chest of individuals with these conditions have revealed pulmonary changes which may prove to be of differential diagnostic value. Of 11 patients with polycythaemia vera, 8 presented abnormally prominent vascular markings roentgenographically; these consisted of accentuation of the truncal shadows extending out to the periphery of the lungs unaccompanied by any evidence of enlargement of the pulmonary conus and right ventricle. These abnormal vascular markings are present only during exacerbations of the disease when cyanosis and vascular engorgement are present. Patients with polycythaemia vera examined during a remission failed to reveal similar vascular prominence. In addition, to the prominence of the vascular trunks, sharply circumscribed, spherical nodules are frequently seen in the middle zone of the lung. As reported in the literature, these nodulations are often of an evanescent nature, developing and regressing rapidly, all in a period of approximately three weeks. In 3 patients observed by the writers these nodulations have remained unchanged for years and have been seen only in patients with polycythaemia vera. The morphology of these lesions is unknown. The experiences of the writers with chest roentgenograms in secondary polycythaemia have been limited to examinations made of 3 patients with pulmonary vascular sclerosis, 2 of whom were studied at postmortem. In these cases the middle and peripheral parts of the lungs appeared normal, provided pulmonary congestion due to cardiac failure had not developed. The evidence suggests that this absence of abnormal markings may be due to the proliferative disease going on in the pulmonary arteries which narrows them, thereby decreasing the quantity of blood flowing through their lumina and into the veins. However, roentgen changes in the hila and cardiac silhouette have been observed frequently in patients with pulmonary arteriosclerosis and secondary polycythaemia. Usually, in the latter condition, chest roentgenograms show considerable increased prominence of the hila and pulmonary conus plus dilatation and hypertrophy of the right heart. These are the compensatory changes which follow obstruction and hypertension in the lesser circulation of the lungs in pulmonary arteriosclerosis.—*Chest Roentgenograms in Polycythemia Vera and Polycythemia Secondary to Pulmonary Arteriolosclerosis, P. J. Hodes & J. Q. Griffith, Am. J. Roentgenol., July, 1941, 46: 52.*—(*W. H. M.*)

Infiltrations of Lung and Positive Wassermann.—Eighteen cases of a mild form of pneumonitis accompanied by transient positive Wassermann reactions are reported. Most cases occurred in young males and were observed in the Swiss army. The clinical picture is mild and the course is undramatic. The temperature may be low-grade for one week, and after this the patient may be afebrile for the duration of the X-ray infiltration. Several cases were afebrile throughout the entire course. The symptoms are those of a mild grippe or bronchitis. The serological reactions for syphilis are strongly positive. If the Wassermann reaction is only mildly positive, the Kahn or Citochol reactions are often four

plus. There is a varying leucocytosis with a substantial shift to the left. The positive serological reaction becomes negative in two to five weeks. It may outlast the pulmonary infiltration. The X-ray picture shows a patchy pneumonitis usually confined to one lobe. The hilar shadow on the same side is greatly enlarged. The only constant bacteriological finding in the sputum is that of large quantities of influenza bacilli. The patients' serum shows agglutination titers from 1:64 to 1:128 for this organism. In fresh cases the lues reactions and the influenza agglutinations were strictly parallel. To prove a causal relationship between the syphilitic and the influenzal antigens, Wassermann negative rabbits were injected with killed preparations of influenza bacilli. After two such injections the Wassermann reaction becomes positive.—*Das Wasserman (Wa-R) positive Lungeninfiltrat, R. Hegglin & A. Grumbach, Schweiz. med. Wchnschr., May 3, 1941, 71: 578.*—(*H. M.*)

Nontuberculous Infections of Lung.—The conditions confused with pulmonary tuberculosis and illustrative cases presenting diagnostic problems are discussed. The importance of a careful history and clinical examination in addition to thorough roentgenographic and bacteriological investigation is emphasized in the differential diagnosis of tuberculosis and unresolved pneumonia, the sequelae of bronchopneumonia (cases of a chronic nature due to streptococci and the influenza bacillus) or bronchiectasis. In 93 per cent of patients with chronic bronchitis of infective origin, septic conditions of the nasopharynx and/or the nasal sinuses were present in the author's series. In 1,200 patients with chronic bronchitis, the greatest number (441) was found between the ages of twenty and thirty; eosinophilia was more marked in the cases of short duration than those existing three or more years; the alkali reserve and creatinine were reduced while amino-nitrogen and uric acid were increased in the blood. The X-ray appearance of bronchiectasis has no definite characteristics; there may be no more than thickened bronchial trunks, a honeycombed appearance or no apparent abnormality. Bronchography and careful sputum studies are often necessary to exclude the diagnosis of tuberculosis. The X-ray appearance of lung abscess differs from that of pulmonary tuberculosis in that the former is usually unilateral. For diagnostic purposes bronchoscopy is sometimes indicated. The differential diagnosis of pulmonary tuberculosis and lues rests upon the following criteria: (*1*) a history of primary infection and evidence of lesions elsewhere in the body, (*2*) absence of serious symptoms, (*3*) persistent absence of tubercle bacilli in sputum or gastric lavage, (*4*) positive Wassermann reaction, (*5*) response to antisyphilitic treatment (disappearance of symptoms and radiological clearing) and (*6*) radiological appearances. Hydatid cysts of the lung may attain large size before giving symptoms and are most commonly found in the right lower lobe. Mycotic disease of the lung has no distinctive clinical picture but may resemble several well recognized pulmonary diseases and can only be diagnosed after the careful study prescribed above. Most of the fungi found in the sputum, however, are secondary invaders and their presence in the sputum is not conclusive evidence that they are responsible for the symptoms produced. Of the fungi the streptothrix is the most common and the most important and while it may produce the same amount of disease as pulmonary tuberculosis, the constitutional symptoms are less severe than in pulmonary tuberculosis of the same extent.—*Chronic Non-Tuberculous Infections of the Lung, A. C. Ukil, Indian M. Gaz., October, 1940, 75: 581.*—(*A. B. C.*),

Infiltrations with Eosinophilia.—From 1925 to the present there were 600 patients admitted to the Union Mission Tuberculosis Sanatorium, Arogyavaram, India, with clinical symptoms of pulmonary tuberculosis confirmed by roentgen films and 20 per cent or more eosinophils. Of these patients, 175 presented X-ray pictures characterized by an evenly distributed extensive mottling of small nodular shadows over both lung fields with increased linear markings. The single shadows are about 2 mm. in size and the general appearance is similar to miliary tuberculosis or silicosis. Sixty-nine per cent of these patients were tuberculin-negative. Of

the 175 patients, 106 had more than 5,000 eosinophils per cmm. The highest eosinophil percentage was 92 per cent. Forty-eight per cent had intestinal infection with helminths, *E. histolytica* or *Giardia*; for the entire series of 600 patients the incidence of helminthic infection was 64.6 per cent. Although helminthiasis and skin infection associated with eosinophilia is common in India, patients with less than 20 per cent eosinophils failed to show the X-ray picture described above. The entire group of 175 patients was sputum-negative. Of the 600 patients, 194 had positive sputum, the percentage of positive sputum rapidly decreasing with the increase in the eosinophil percentage. The lung condition presented cannot be explained as due to tuberculosis, syphilis or heart disease. The possibility of dust inhalation as an aetiological factor is being considered. The condition differs from that described by Löffler since in none of the cases presented were the lesions transitory and in most no changes were observed during the period of observation. The condition, however, has some similarity to certain types of bronchial asthma observed in India and thought to be associated with intestinal infection, and may be allergic in origin. The importance of differential counts in the diagnosis of doubtful cases of tuberculosis is evident.—*A Pseudo-Tuberculous Condition Associated with Eosinophilia, C. Frimodt-Möller & R. M. Barton, Indian M. Gaz., October, 1940, 75: 607.*—(*A. B. C.*)

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